

State of Hawaii
DEPARTMENT OF LAND AND NATURAL RESOURCES
Division of Aquatic Resources
Honolulu, Hawaii 96813

April 21, 2011

Board of Land
and Natural Resources
Honolulu, Hawaii

Request for Authorization and Approval to Issue a Papahānaumokuākea Marine National Monument Conservation and Management Permit to Frank Parrish and Alecia Van Atta, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, for Access to State Waters to Conduct Shark Monitoring and Removal Activities

The Division of Aquatic Resources (DAR) hereby submits a request for your authorization and approval for issuance of a Papahānaumokuākea Marine National Monument conservation and management permit to applicants Frank Parrish, Chief of Protected Species Division, and Alecia Van Atta, Assistant Regional Administrator for Protected Resources, of the National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service, pursuant to § 187A-6, Hawaii Revised Statutes (HRS), chapter 13-60.5, Hawaii Administrative Rules (HAR), and all other applicable laws and regulations.

The conservation and management permit, as described below, would allow entry and management activities to occur in Papahānaumokuākea Marine National Monument (Monument), including the NWHI State Marine Refuge and the waters (0-3 nautical miles) surrounding the following site:

- French Frigate Shoals

The activities covered under this permit would occur between April 10, 2011 and September 1, 2011.

The proposed activities are largely a continuation of work previously permitted and conducted in the Monument.

INTENDED ACTIVITIES

The applicants propose to conduct management activities for the conservation of Hawaiian monk seals, including (A) monitoring of shark activity at select pupping sites and (B) the removal of predatory sharks from these areas. The proposed activities would support the recovery of Papahānaumokuākea Marine National Monument's endangered Hawaiian monk seals by reducing the likelihood of shark predation on seal pups at French Frigate Shoals (FFS). This activity, when combined with other conservation efforts, would help address the problem of low juvenile seal survival, a factor identified as one of the main causes of Hawaiian monk seal

population decline in the Monument. Increased survival of pups is necessary for the species' recovery.

To achieve the purpose stated in (A), to monitor shark activity, applicants propose to monitor shark activity via human and/or remote camera observation at islets of French Frigate Shoals when Hawaiian monk seal pups are present to determine when predatory activity commences and what species of sharks are involved. Specific activities would include overnight camping on the islets of FFS, as well as the erection of a 12-ft observation tower on Trig.

The applicants also propose to (B) remove sharks observed to be pursuing, injuring or killing pups or those observed to be patrolling within 50m of the shoreline of Trig, Gin, and Little Gin islets when pups are present.

Applicants aim to remove a maximum of 19 sharks between April 10 and September 1, 2011. Removals would not commence until shark activity near pupping sites has been observed. Shark removals would be limited to Galapagos sharks (*Carcharhinus galapagensis*), as they are the only shark species that staff of the Hawaiian Monk Seal Research Program (HMSRP) has positively identified pursuing, injuring or killing pups during observations over the last 10 years.

Sharks observed in predatory behavior would then be caught by the following methods approved for use at this location in the past: 1) hand line, 2) hand-held harpoon, 3) net surprise.

Hand lines would be deployed only from shore, with crew in small boats assisting as necessary. For all methods, captured sharks would be pulled into shore or along side a small boat, tail-rope and killed with a bang stick. Shark carcasses would be examined and desired remains retained to fulfill Native Hawaiian practices and to conduct scientific analyses; thereafter, remains would be retained for bait or disposed of at deepwater locations (0.5 miles beyond the break reef from Tern Island). Activities would be conducted by field camp personnel already on site to conduct monk seal population assessments. Personnel are currently being trained on safety protocols.

The activities proposed by the applicant directly support the Monument Management Plan's priority management need 3.2 - Conserving Wildlife and Habitats through activity TES 1.6 - Reduce shark predation on monk seals. In addition, monitoring shark activity and removing sharks are both listed in the Hawaiian Monk Seal Recovery Plan (NMFS 2007) as necessary activities, critical to the species' recovery.

The activities described above may require the following regulated activities to occur in State waters:

- ☒ Removing, moving, taking, harvesting, possessing, injuring, disturbing, or damaging any living or nonliving Monument resource
- ☒ Anchoring a vessel
- ☒ Discharging or depositing any material or matter into the Monument
- ☒ Possessing fishing gear except when stowed and not available for immediate use during passage without interruption through the Monument
- ☒ Attracting any living Monument resource

REVIEW PROCESS

The permit application was sent out for review and comment to the following scientific and cultural entities: Hawaii Division of Aquatic Resources, Hawaii Division of Forestry and Wildlife, Papahānaumokuākea Marine National Monument (NOAA/NOS), NOAA Pacific Islands Regional Office (NOAA-PIRO), United States Fish and Wildlife Service Hawaiian and Pacific Islands National Wildlife Refuge Complex Office, and the Office of Hawaiian Affairs (OHA). In addition, the permit application has been posted on the Monument Web site since October 7, 2010, giving the public an opportunity to comment. The application was posted within 40 days of its receipt, in accordance with the Monument's Public Notification Policy.

Comments received from the scientific community are summarized as follows:

Scientific reviews support the acceptance of this application.

The following issues were raised:

1. Does the mere presence of a shark within designated areas constitute patrolling behavior? If not, what defines patrolling behavior?
2. Other than safety concerns, are there other bases, perhaps scientific data that may support your proposed discharge location at 0.5 miles outside the atoll?
3. Does NMFS intend to tag undersized Galapagos sharks as recommended by HIMB?
4. Night monitoring for shark activity is strongly recommended, in order to possibly fill-in data gaps concerning which shark species (Tiger versus Galapagos) may be responsible for pup predation.
5. The use of monk seal flesh as bait is not recommended based on 1) strong agency and community concerns and 2) likelihood of obtaining 5.5 lbs of monk seal flesh for each fishing attempt (as recommended by HIMB)

Comments received from the Native Hawaiian community are summarized as follows:

Cultural reviews were supportive of monitoring and camping activities.

Comments received from the public are summarized as follows:

No comments were received from the public on this application.

Additional reviews and permit history:

Are there other relevant/necessary permits or environmental reviews that have or will be issued with regard to this project? (e.g., MMPA, ESA, EA) Yes ☒ No ☐

If so, please list or explain:

- NMFS ESA/MMPA Research and Enhancement Permit 10137-04.

- NMFS 2010. Supplemental Environmental Assessment of the Program for Decreasing or Eliminating Predation of Pre-weaned Hawaiian Monk Seal Pups by Galapagos Sharks in the Northwestern Hawaiian Islands. Pacific Islands Fisheries Science Center, Protected Species Division, Hawaiian Monk Seal Research Program.
- The proposed activities are in compliance with HRS Chapter 343 (exemption class HAR §11-200-8(a)(5)).

Has Applicant been granted a permit from the State in the past? Yes ☒ No ☐

If so, please summarize past permits:

- The applicant was granted permit PMNM-2007-053 in 2007 for unrelated work and permit PMNM-2010-014 in 2010 for similar work.
- George Antonelis was granted permit PMNM-2007-025 in 2007 for activities similar to those being proposed by the current applicants.

Have there been any a) violations: Yes ☐ No ☒

b) Late/incomplete post-activity reports: Yes ☐ No ☒

Are there any other relevant concerns from previous permits? Yes ☐ No ☒

RESPONSE

1. In the nearshore areas, the Applicants classify shark activity (cruising, patrolling, pursuing or attacking) along a continuum of directed behavior, with cruising as the least directed. Patrolling typically involves repeated back and forth movement that appears more directed than a shark that is passing by/cruising along in one direction and away from the islet.
2. The Applicants' main basis for proposing a discard location nearer to Tern is safety concerns. However, the Applicant states that discarding bait at 0.5 mi versus 3 mi outside of the atoll should not impact the number of Galapagos sharks coming into the shallow areas near pupping sites because 1) both distances are outside of the barrier reef and beyond the area where the most Galapagos sharks have been caught and tagged in recent research, and 2) Galapagos shark distribution is significantly stratified at FFS.
3. The Applicants state that an obviously small shark that is only cruising and takes bait will be tagged and released. The Applicants intend to tag with simple streamer tags due to budget constraints. This method involves placing a small flat metal arrow-shaped, 0.5 inch-wide "tack" with a plastic colored streamer flag attached into the shark's skin via a tagging pole and will be accomplished while the shark is on the hook or in the stealth net. It will allow the Applicants to re-identify the animal for several weeks to months thereafter.
4. The Applicants state they can attempt to replicate the pup night behavioral study conducted in 2009. Crew can attempt to conduct pup checks throughout the night (on a

certain interval) and initiate focal follows on those that are not sleeping. It is difficult to identify shark dorsal fins at the water's surface in the dark due to the glare (starlight and moonlight reflecting off the water); however, if it is obvious that a shark is near a pup in the water or wavewash, field personnel can attempt to view it with the night vision scope.

5. The Applicants acknowledge the concerns, value this input and will continue to work with their cultural liaison and practitioner partners to further understand these concerns. If further discussion regarding the concerns is necessary, the Applicants welcome the opportunity to facilitate a discussion with their cultural liaison. Regarding the size/mass of seal flesh needed, the Applicants state that HIMB personnel recommend bait size of 5.5 lbs for the longline/bottomset fishing method (no longer being requested in this application) in order to target large sharks and avoid bycatch and bait loss. However, for the more selective handline fishing, smaller bait sizes should not affect the probability of bycatch because the hook will not be dropped and left to passively fish. It will instead be actively worked close to shore where staff will be able to see the baited hook. The gear will be pulled when potential bycatch are seen close and/or are showing interest in the baited gear. Thus, the Applicants should be able to use bait substantially smaller than a 5.5 lbs piece with no bycatch and maximum effectiveness in terms of target shark removal.

STAFF OPINION

DAR staff is of the opinion that Applicants have properly demonstrated valid justifications for their application and should be allowed to enter the NWHI State waters and to conduct the activities therein as specified in the application with the following special instructions and conditions, which are in addition to the Papahānaumokuākea Marine National Monument Conservation and Management Permit General Conditions. All suggested special conditions have been vetted through the legal counsel of the Co-Trustee agencies (see Recommendation section).

MONUMENT MANAGEMENT BOARD OPINION

For Part (A), monitoring of shark activity at select pupping sites:

The MMB is of the opinion that the Applicant has met the findings of Presidential Proclamation 8031 and this activity may be conducted subject to completion of all compliance requirements. The MMB concurs with the special conditions recommended by DAR staff.

For Part (B), removal of predatory sharks from select pupping sites:

The MMB could not reach consensus regarding the proposed removal activities. Issues were raised as to whether the activities proposed in Part B conflict with Finding 10 of Presidential Proclamation 8031 (*There are no other factors that would make the issuance of a permit for the activity inappropriate*). The agencies in support of this activity recommend issuance of a permit that would require specific reporting, as well as agreed upon respectful treatment, of any shark

caught. In addition, the agencies do not support the use of monk seal flesh as bait. The MMB regrets it could not reach consensus, as this has been and continues to be, the preferred means of developing permit recommendations.

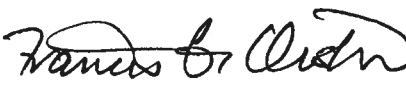
Due to the noted lack of consensus on Part B, for the purposes of this permit the MMB considers Parts A and B to be severable, such that failure to approve Part B would not preclude or invalidate approval of Part A.

RECOMMENDATION


That the Board authorize and approve a Conservation and Management Permit, for both Parts A and B, to Frank Parrish and Alecia VanAtta with the following special conditions:

1. This permit is not to be used for nor does it authorize the sale of collected organisms. Under this permit, the authorized activities must be for noncommercial purposes not involving the use or sale of any organism, by-products, or materials collected within the Monument for obtaining patent or intellectual property rights.
2. The permittee may not convey, transfer, or distribute, in any fashion (including, but not limited to, selling, trading, giving, or loaning) any coral, live rock, or organism collected under this permit without the express written permission of the Co-Trustees.
3. To prevent introduction of disease or the unintended transport of live organisms, the permittee must comply with the disease and transport protocols attached to this permit.
4. Tenders and small vessels must be equipped with engines that meet EPA emissions requirements.
5. Refueling of tenders and all small vessels must be done at the support ships and outside the confines of lagoons or near-shore waters in the State NWHI Marine Refuge.

Respectfully submitted,


for Administrator

APPROVED FOR SUBMITTAL


WILLIAM J. AILA JR.
Chairperson

LINDA LINGLE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF AQUATIC RESOURCES
1151 PUNCHBOWL STREET, ROOM 330
HONOLULU, HAWAII 96813

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

RUSSELL TSUJI
DEPUTY DIRECTOR - LAND

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

April 8, 2011

TO: Division of Aquatic Resources File

THROUGH: William J. Aila Jr., Chairperson

FROM: Francis Oishi
Division of Aquatic Resources

DECLARATION OF EXEMPTION FROM THE PREPARATION OF AN ENVIRONMENTAL ASSESSMENT
UNDER THE AUTHORITY OF CHAPTER 343, HRS AND CHAPTER 11-200 HAR, FOR
PAPAHĀNAUMOKUĀKEA MARINE NATIONAL MONUMENT CONSERVATION AND MANAGEMENT
PERMIT TO FRANK PARRISH AND ALECIA VAN ATTA, NOAA FISHERIES, PACIFIC ISLANDS
FISHERIES SCIENCE CENTER, FOR ACCESS TO STATE WATERS TO CONDUCT SHARK MONITORING
AND REMOVAL ACTIVITIES UNDER PERMIT PMNM-2011-007.

The following permitted activities are found to be exempted from preparation of an environmental assessment under the authority of Chapter 343, HRS and Chapter 11-200, HAR:

Project Title:

Papahānaumokuākea Marine National Monument Conservation and Management Permit to Frank Parrish and Alecia Van Atta, NOAA Fisheries, Pacific Islands Fisheries Science Center, for Access to State Waters to Conduct Shark Monitoring and Removal Activities

Permit Number: PMNM-2011-007

Project Description:

The conservation and management permit, as described below, would allow entry and activities to occur in Papahānaumokuākea Marine National Monument (Monument), including the NWHI State waters from April 10, 2011 through September 1, 2011.

This is an effort to conduct management activities for the conservation of Hawaiian monk seals, including (A) monitoring of shark activity at select pupping sites and (B) the removal of predatory sharks from these areas. The activities would support the recovery of the endangered Hawaiian monk seal by reducing the likelihood of shark predation on seal pups at French Frigate Shoals.

The activities are in direct support of the Monument Management Plan's priority management needs 3.2 – Conserving Wildlife and Habitats, through action plan 3.2.1 – Threatened and Endangered Species. This action plan includes an activity to reduce shark predation on monk

April 8, 2011

seals. Monitoring shark activity and removing sharks are also both listed in the Hawaiian Monk Seal Recovery Plan (NMFS 2007) as necessary activities, critical to the species' recovery.

In addition, activities to support threatened and endangered species in the NWHI are addressed in the Monument Management Plan Environmental Assessment. This EA covers field activities "to monitor predation of sharks on Hawaiian monk seals and its effects and develop and implement methods to deter predation" (PMNM MMP Vol 2, p.173). The EA states that these activities could have a beneficial effect on the endangered monk seal by decreasing population loss.

Consulted Parties:

The permit application was sent out for review and comment to the following scientific and cultural entities: Hawaii Division of Aquatic Resources, Hawaii Division of Forestry and Wildlife, Papahānaumokuākea Marine National Monument (NOAA/NOS), NOAA Pacific Islands Regional Office (NOAA-PIRO), United States Fish and Wildlife Service Hawaiian and Pacific Islands National Wildlife Refuge Complex Office, and the Office of Hawaiian Affairs (OHA). In addition, the permit application has been posted on the Monument Web site since October 7, 2010, giving the public an opportunity to comment. The application was posted within 40 days of its receipt, in accordance with the Monument's Public Notification Policy.

Exemption Determination:

After reviewing HAR § 11-200-8, including the criteria used to determine significance under HAR § 11-200-12, DLNR has concluded that the activities under this permit would have minimal or no significant effect on the environment and that issuance of the permit is categorically exempt from the requirement to prepare an environmental assessment based on the following analysis:

1. All activities associated with this permit, including monitoring and removal of sharks, have been evaluated as a single action. As a preliminary matter, multiple or phased actions, such as when a group of actions are part of a larger undertaking, or when an individual project is precedent to or represents a commitment to a larger project, must be grouped together and evaluated as a single action. HAR § 11-200-7. This permit may involve an activity that is precedent to a later planned activity, i.e. the continued removal of sharks next year if 19 are not removed this year, or removal of an additional 20 sharks. Subsequent activities will depend largely on the results achieved under this permit.

2. The Exemption Class for Experimental Management with no Serious or Major Environmental Disturbance Appears to Apply. Chapter 343, HRS, and § 11-200-8, HAR, provide for a list of classes of actions exempt from environmental assessment requirements. HAR §11-200-8.A.5. exempts the class of actions which involve "basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource." This exemption class has been interpreted to include "wildlife management actions including predator control", such as those being proposed.

The proposed removal activities here appear to fall squarely under the exemption class #5, exempt item #5 as described under the Division of Forestry and Wildlife exemption list published on June 12, 2008. As discussed below, no significant disturbance to any environmental resource is anticipated in the monitoring and removal of a limited number of

April 8, 2011

sharks. Thus, so long as the below considerations are met, an exemption class should include the action now contemplated.

3. Cumulative Impacts of Actions in the Same Place and Impacts with Respect to the Potentially Particularly Sensitive Environment Will Not be Significant. Even where a categorical exemption appears to include a proposed action, the action cannot be declared exempt if “the cumulative impact of planned successive actions in the same place, over time, is significant, or when an action that is normally insignificant in its impact on the environment may be significant in a particularly sensitive environment.” HAR § 11-200-8.B. To gauge whether a significant impact or effect is probable, an exempting agency must consider every phase of a proposed action, any expected primary and secondary consequences, the long-term and short-term effects of the action, the overall and cumulative effect of the action, and the sum effects of an action on the quality of the environment. HAR § 11-200-12. Examples of actions which commonly have a significant effect on the environment are listed under HAR § 11-200-12.

This project will continue shark removal activities that were undertaken in 2007 and 2010 under permits PMNM-2007-025 and PMNM-2010-014, which had no deleterious effects on Monument resources. Possible adverse affects on the coral reef ecosystem at French Frigate Shoals (FFS) from shark removals were investigated using the EcoSim model (Parrish, NMFS). Results from that work indicated that the removal of 20 sharks had a nearly imperceptible effect on the dynamics of the FFS ecosystem. With that in mind, significant cumulative impacts are not anticipated as a result of this activity, and numerous safeguards further ensure that the potentially sensitive environment of the project area will not be significantly affected. All activities will be conducted in a manner compatible with the management direction of the Monument Proclamation in that the activities do not diminish monument resources, qualities, and ecological integrity, or have any indirect, secondary, cultural, or cumulative effects. The joint permit review process did not reveal any anticipated indirect or cumulative impacts that would occur as a result of these activities.

These activities would be conducted from the seasonal monk seal field camp based on FFS. The operation of the field camp, as well as associated monitoring activities, are covered under the Manager’s permit PMNM-2011-001. Interactions with sharks at FFS will also be undertaken, for the purpose of shark tagging, by Carl Meyer under permit PMNM-2011-018. Meyer’s work will be conducted from the NOAA Ship HI’IALAKAI at various times throughout the season, and it is anticipated that Meyer will spend less than 7 days total working at FFS. Therefore, the culmination of these permits is not anticipated to have significant cumulative impacts.

Since no significant cumulative impacts or significant impacts with respect to any particularly sensitive aspect of the project area are anticipated, the categorical exemptions identified above should remain applicable.

4. Overall Impacts will Probably be Minimal and Insignificant Any foreseeable impacts from the proposed activity will probably be minimal, and further mitigated by general and specific conditions attached to the permit. Specifically, all conservation and management activities covered by this permit will be carried out with strict safeguards for the natural, historic, and cultural resources of the Monument as required by Presidential Proclamation 8031, other applicable law and agency policies and standard operating procedures.

April 8, 2011

Conclusion. Upon consideration of the permit to be approved by the Board of Land and Natural Resources, the potential effects of the above listed project as provided by Chapter 343, HRS and Chapter 11-200 HAR, have been determined to be of probable minimal or no significant effect on the environment and exempt from the preparation of an environmental assessment.

William J. Aila Jr.
Board of Land and Natural Resources

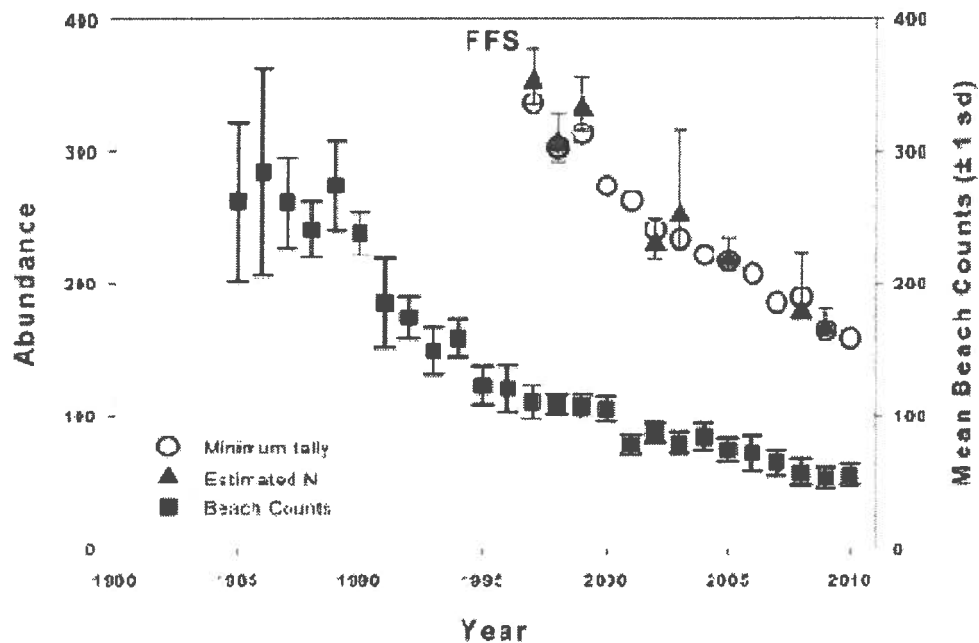
Date

**Response to MMB Request for Additional Information on the
Revised 2011 Parrish/Van Atta Permit Application**

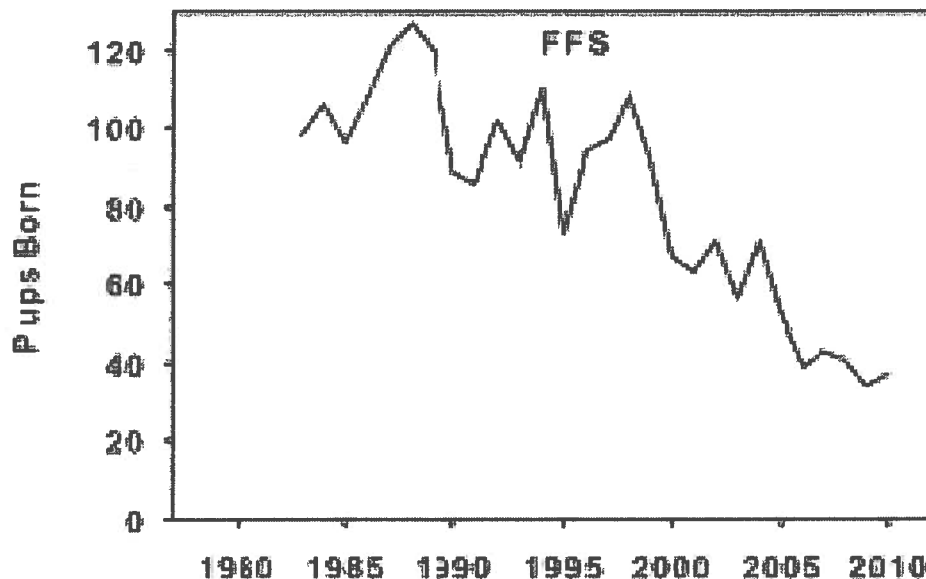
Introduction

Our Hawaiian monk seal population is heading towards extinction, with the numerous threats across its range and is listed as critically Endangered under the US Endangered Species Act. This status requires NOAA (through the National Marine Fisheries Service) and the U.S. Fish and Wildlife Service to implement measures aimed at recovery of the Hawaiian monk seal. Today there are approximately 900 monk seals in the Hawaiian archipelago.

Estimates of non-pup abundance and mean non-pup beach counts at French Frigate Shoals



Pup production at French Frigate Shoals



In the Northwestern Hawaiian Islands (NWHI), the key threat to the survival of the species is falling birth rates combined with poor survival of juvenile Hawaiian monk seals to reproductive age. Many of these young animals have failed to thrive, and only one of every 5 lives to reach maturity. The age structure of the population is unfavorable for future population growth and the total population is likely to fall below 1,000 individuals within a few years.

This decline will continue and the conservation challenge will intensify unless scientists and managers, working together, develop the means to improve juvenile survival. Improving juvenile survival is one of four key activities highlighted in the updated Recovery Plan for the Hawaiian monk seal, published by NOAA in 2007. The four activities are:

1. Improving juvenile survival through direct intervention such as providing captive care and feeding
2. Mitigating mortality due to entanglement in marine debris
3. Reducing shark predation on seal pups
4. Ensuring growth of the small Main Hawaiian Islands seal population

Items 1, 2, and 4 from the list above are being pursued through a series of other programs/applications.

Recognizing the extreme threat posed by shark predation to the Hawaiian monk seal population, both the Hawaiian Monk Seal Recovery Plan and the Papahānaumokuākea Marine National Monument Management Plan list “Reduce Shark Predation on Monk Seals” as a critical activity. Shark predation of pre-weaned and newly weaned pups contributes to a unique and extreme situation at French Frigate Shoals (FFS) which was once the largest segment of the population. This level of predation stands out from the trends observed at other sites within the NWHI. We are still seeing a decline of 6-11 monk seal pups a year from predation alone (about 15-25% of each cohort). Although some pup mortality is to be expected, this rate is far greater than at other sites and across recent history (since 1980 when regular monitoring began) and is unsustainable.

Last field season, of the 36 monk seal pups were born at FFS, 17 were weaned successfully and eight were lost to shark predation (two pups died from other causes, and nine pups were still nursing at the end of the camp season) (NMFS, unpublished data). The lethal attacks on pups were evidenced by direct observation, presence of shark-inflicted wounds on each pup, and the disappearance of an otherwise healthy pup that could not be attributed to any other cause (i.e. severe weather). With such small numbers of pups being born each year at FFS, there is a clear need to dramatically cut the proportion of each monk seal cohort that is lost to shark predation. Increasing survival of just 1-2 individuals is a significant portion of that goal.

Over the last decade, the HMSRP has employed a number of techniques to mitigate the effects of shark predation on this critically endangered species. The team has conducted intensive monitoring and standardized observation and data collection to quantify the threat posed by shark predation and to determine which species of shark is preying upon monk seal pups. The team also conducts translocation of weaned pups to safer islets within FFS. However, the danger to pre-weaned and newly weaned pups cannot be addressed by data collection nor by translocation since pups cannot be removed from their mothers before weaning. [Translocation of mother-pup pairs is not feasible due dangers to the health and welfare of mothers and pups, as well as the extreme cost and risk involved in the care of pups should they be abandoned].

To further address the threat of shark predation, the HMSRP has under previous year Monument permits employed techniques to protect the pre-weaned and newly weaned pups including harassment of sharks, deployment of devices to deter predation, and removal of predatory sharks.

This year's permit application is a slight modification to last year's permit. It seeks to gain re-authorization of efforts that have been employed by the HMSRP to protect pre-weaned and newly weaned pups. This request is for removal of 19 predatory sharks from islets at FFS. Last year we were permitted to remove 20 sharks (but ultimately only took 1 shark).

History of efforts to mitigate shark predation on pre-weaned and newly-weaned pups at FFS

As part of the overall strategy to increase pup survival, HMSRP has worked on trying to mitigate Galapagos shark predation of pups at FFS for over 10 years. This work, and the work of Dr. Carl Meyer, University of Hawaii's Hawaii Institute of Marine Biology, has provided a great deal of information about the issue at FFS: the extent of predation temporally and spatially, the segment of the monk seal population affected by shark predation and the frequency of these effects, the shark species involved, the fraction of the greater shark population that is involved, seal behavior (mother and pup), the uniqueness of this predation at FFS as compared to other NWHI sites, and the impact of this pup mortality on recruitment and persistence of the FFS seal population. Results confirm that shark predation has a negative and significant impact on the persistence of the monk seal population at FFS. Further results from the HIMB research indicate it is a small number of the overall Galapagos shark population that is undertaking this atypical predatory behavior.

In 2011, the FFS monk seal population assessment team will once again be undertaking extensive observations and camping to document shark activity and accomplish timely and effective pup mortality mitigation activities. Should the permit to attempt shark removal be approved, the main impact to the field team would be to allow personnel already on scene to intervene rather than just observe when a shark is preying on a monk seal pup. It would not impact their ability to accomplish their population assessment tasks.

From the initial inception of the shark predation mitigation activity, the removal of sharks was always intended to be one of a suite of methods aimed at increasing the survival of Hawaiian monk seal pups within Papahānaumokuākea Marine National Monument. A separate Monument permit for other pup survival enhancement measures is currently active and we intend to request renewal this permit in future years.

The objective of the shark mitigation permit application is to physically prevent Galapagos sharks and pups from coming in contact with each other. One method used to ensure the physical separation of these two species is the translocation of monk seal pups to safer islets as soon as is physiologically possible (after weaning). The HMSRP has demonstrated that harassing Galapagos sharks and using activities and devices aimed to deter Galapagos shark predation is ineffective across multiple trials in multiple years. For Galapagos sharks, the only method to keep a shark away from pups once it has entered the near-shore area proximal to the pups is to capture it and remove it. No other options exist. A failure to keep the two species separate allows predation to occur and amounts to standing by as the entire monk seal subpopulation is substantially impacted.

Given that harassment and use of deterrents aimed at stopping Galapagos shark predation on pre-weaned and newly-weaned Hawaiian monk seals has proven ineffective, the only viable method remaining to protect these vulnerable pups (as they are not eligible for translocation until after weaning) is to remove sharks that exhibit predatory behavior in the vicinity of the FFS pupping sites.

Small-scale operations to remove Galapagos sharks were initiated in 2000 and continued each year thereafter until 2007. A total of 12 Galapagos sharks were removed from 2000 to 2006, all using shore-based methods (harpooning and fishing with handlines in shallow waters primarily near Trig). Drumlines were used in 2007 but yielded no catch (NMFS, unpublished).

The boat-based bottomset is an excellent tool for catching sharks, however, it is somewhat non-selective as it will catch non-target Galapagos sharks as well as tiger sharks and ulua, and it requires a great level of fishing skill due to the need to control very large sharks along the side of a small boat. Last year's bottomset efforts by professional fishers did result in some bycatch, however, all non-target catch was released alive.

Shore-based fishing has proven to be a highly selective and effective method for removal of target sharks and has fewer risks than boat based fishing, however, it requires sharks to be brazen during the day (which is a highly variable behavior) so overall catch rates may be lower than if bottomset and drum line gear types were used. Still, this is considered the most effective and safest method of the various methods used in the past. Since the year 2000, 13 sharks have been successfully caught and removed from FFS. 12 of these 13 have been caught by shore-based methods.

Other efforts to enhance survival of Hawaiian monk seal pups and juveniles in the NWHI

A number of methods are undertaken to enhance the survival of Hawaiian monk seal pups and juveniles in the NWHI.

These efforts include:

- Annual evaluation of the six primary populations in the Northwestern Hawaiian Islands. Researchers establish temporary field camps and assess Hawaiian monk seal abundance, age and sex composition, survival, reproduction, feeding habits, entanglement rates in marine debris, and other factors that may limit population growth.
- Translocation of weaned pups from locations with low survival rates at FFS to other sites in the atoll where the pups have a higher probability of survival.
- Removal or harassment of aggressive male monk seals causing mortality of adult females and juveniles of both sexes.
- Characterization of important monk seal foraging habitat and prey species.
- Investigation of health and disease factors that may be limiting population growth.
- Removal of entangling marine debris from beaches and coral reefs and disentangling monk seals and other wildlife.
- Understanding low juvenile and pup survival.
- Deworming juvenile seals to mitigate food limitation stresses
- Captive care and rehabilitation of sick, injured, or undernourished seals

Our field staff is asked to complete a number of different activities as part of their mission at FFS. For example, in 2009 a four-person team performed all seal monitoring work, performed a systematic

controlled shark-deterrent study, translocated newly weaned pups as FFS, attached sonic tags to weaners, performed all work related to a larger translocation program of FFS weaners to Nihoa, performed a pup night behavior study which involved camping on Trig for more than 30 nights and the Gins for 7 nights, installed a temporary remote camera system for the first time, and conducted a shark monitoring program. They successfully completed all their planned objectives.

Summary

The Hawaiian monk seal is a critically endangered species, and NOAA is bound by federal law to implement a plan for the recovery of the Hawaiian monk seal. As part of the suite of mitigation measures aimed at improving juvenile survival of the Hawaiian monk seal, permission for access to Papahānaumokuākea Marine National Monument (PMNM) is being requested to enhance survival of Hawaiian monk seal pre-weaned and newly-weaned pups by removing predatory Galapagos sharks from French Frigate Shoals. Given the status of the Hawaiian monk seal, even one pup saved from predation by Galapagos sharks is considered a success.

Receiving a permit for access to PMNM to conduct this activity will provide the NOAA/NMFS field staff with a tool that will allow them to intervene if aggressive, predatory behavior by Galapagos sharks is exhibited toward these particularly vulnerable pre-weaned and newly weaned monk seal pups. Not receiving a permit for access to PMNM to conduct this activity will mean requiring NOAA/NMFS field staff to simply stand by and record data and video as monk seal pups are killed by predatory Galapagos sharks. NOAA/NMFS has selected the most appropriate and safest gear types to ensure that the effort will be most likely to target only the Galapagos sharks observed to exhibit predatory behavior, and has carefully selected an expanded set of field staff with the necessary experience to conduct this activity safely. The staff is being trained in additional field protocols and hazard mitigation techniques to minimize the chances of injury to personnel during the conduct of this activity.

For more detailed information specific to this discussion, three supplementals are provided:
Supplemental Information A: Comparison of revised and original Parrish/Van Atta permit application
Supplemental Information B: Field Personnel Experience and Expertise
Supplemental Information C: Safety Protocols for Shark Removal Activity

Supplemental Information A: Comparison of revised and original Parrish/Van Atta permit application

The 2011 Parrish/Van Atta permit to enhance survival of Hawaiian monk seal pups through monitoring and removal of predatory Galapagos sharks

Given the status of the Hawaiian monk seal as a critically Endangered Species, even one pup saved from predation by Galapagos sharks is considered a success. Giving our field staff the tools they need to act (instead of standing by to observe a mortality) is crucial to that success.

The original permit application included five fishing methods and the revised application reduced this number to three. This is the ONLY modification from what was proposed in the original permit application.

Original fishing methods proposed:

- Longline bottomset line with up to 5 hooks attached laterally to the bottom line, with the bottom line secured to the anchors at either end, marked with floats.
- Single hook attached to a drumline (a floating, anchored drum).
- Simple handline from the boat or shore.
- Harpoon.
- Stealth tangle net ("Surprise Net") that is deployed by hand (simply by turning on the air flow from a diving tank). This stealth net rests in a chain-weighted tube on the seafloor. It is approximately 100 m in length and will be set in an arc from shore with its ends on the beach; once air flow is turned on, the net deploys in approximately 10 seconds.

Revised methods proposed:

- Simple handline.
- Harpoon.
- Stealth tangle net ("Surprise Net") that is deployed by hand (simply by turning on the air flow from a diving tank). This stealth net rests in a chain-weighted tube on the seafloor. It is approximately 100 m in length and will be set in an arc from shore with both ends on the beach.; once air flow is turned on, the net deploys in approximately 10 seconds.

All the techniques that were originally proposed are viable, proven methods for removal of sharks at FFS. The techniques remaining in the permit application will allow us to specifically target the most aggressive predatory sharks and are safest methods that have the greatest likelihood of meeting the goals of this effort.

Fishing will primarily occur from shore. Crew on a small boat may assist in capture and/or euthanasia. Discarding bait and shark remains will occur via small boat. We do not expect a harpooned shark to escape because the harpoon will have a line on it and once a shark is harpooned, an anchor can be hooked to the line, and then the shark can be pulled to shore.

Bait will be tuna, shark remains or dead monk seal flesh (if permitted). Two staff will work together to conduct the removal activities and 2 staff will be on call (via small boat). If shark activity is obvious and brazen, all four staff may participate in removal activities at the same time. Euthanasia will occur with a bangstick. To follow the manufacturer's recommendations, the bangstick must be fired in at

least a few inches of water; thus the hooked, harpooned or netted shark may be secured in the wavewash area. The handline or harpoon tether will be anchored as necessary. Euthanized Galapagos sharks will be sampled and remains discarded at a deep water location as described in the permit application (e.g. 0.5 miles beyond the break reef from Tern).

Once a large Galapagos shark (approximately 6-8 feet) is observed patrolling the nearshore waters (within 50m) of Trig and Gins or an incident (wounding or shark-inferred disappearance) on a pup has occurred, staff will have the option to fish using handlines, harpoon or "net surprise" from shore and will be assisted by small boat as necessary.

Patrolling is operationally defined as a back and forth swimming pattern as compared to a one-way swimming vector that indicates the individual is traversing one area to the next but has not displayed interest in the objects or seals on shore or close to shore.

These criteria would have been met on 10 days of the 2010 field season and 17 days of the 2009 field season. Extra monitoring effort will occur when weaning is imminent; therefore, sightings may increase during this time which in turn may lead to additional fishing days.

Galapagos shark behavior around the pupping islets during the breeding season is highly variable from year to year; in any given year it is uncertain as to what shark activity pattern will be displayed (Dale et al. 2010) and what fishing technique will prove successful. Given the known budget constraints, limiting the shark removal efforts to shore-based gear types allows HMSRP to balance our recovery mandates at FFS, the effort required to fish, and the risks of fishing for sharks while still being able to reasonably expect that some pups will be protected either because 1) a few especially brazen sharks will be caught, and/or 2) the activity of fishing may increase shark wariness.

While a large-scale removal effort outside the atoll would yield a larger CPUE of Galapagos sharks, the proposed removal protocol ensures that any removals will be sharks that are demonstrating predatory behavior. This smaller-scale, more targeted effort is proposed because it is the best available tool we have to protect monk seal pups from the Galapagos sharks that exhibit this predatory behavior.

When a shark is hooked, harpooned or netted it will be brought to shore or, on rare occasion, along the side of the small boat and secured (e.g. tail-roped), its species identified and its body measured. Only Galapagos sharks with a minimum fork length of 200 cm will be euthanized. Other species or smaller Galapagos sharks will be photographed, dehooked and released.

In past years, HMSRP caught sharks with handlines, brought them to shore and dispatched them there with the bangstick in shallow water on the shore line. Details of all captures and releases occurring this season (2011) will be recorded on data forms for reporting purposes.

It cannot be emphasized enough that shark behavior (aggressiveness and level of activity) from season to season is extremely variable. Some years there are regular sightings of Galapagos sharks pursuing monk seal pups in the shallows, while in other years observers have noted only a few sightings of dorsal fins just offshore.

Supplemental Information B: Field Personnel Experience and Expertise

There are two important aspects to consider when assessing the “appropriateness” of our FFS field crew taking on fishing responsibilities. The first is their experience around sharks and in particular shark fishing. The second is their experience in remote situations with wild animals. This second point is raised because experience in dangerous situations with wildlife creates an appreciation for the unpredictability of dealing with wild animals as well as a situational awareness which increases the ability to recognize and mitigate risk.

Because of the increased responsibility of shark fishing, we have added an additional staff person bringing the camp from three to four at French Frigate Shoals.

The FFS field camp is comprised of four personnel:

- Shawn Farry (co-leader),
- Mark Sullivan (co-leader),
- Brendan Hurley (assistant),
- Ben Cook (assistant)

The team’s experience with sharks is varied but all have at least some exposure to fishing for and catching sharks. Initially, no fishing will occur if either Mark or Shawn is not present. They will rotate through surveys paired with one of the assistants so that someone experienced at FFS is there to conduct or oversee fishing. Later in the season the assistants will be given greater independence if experience warrants it.

Shawn Farry has extensive experience dealing with the shark situation at FFS. Shawn observed PSD shark fishing activities at FFS in 2002, 2003 & 2007; observed and was onsite PSD liaison to shark research and fishing activities at FFS in 2009, and supervised and assisted with PSD shark fishing activities at FFS in 2010.

Mark Sullivan has also work for several years at FFS. Mark observed PSD shark fishing activities at FFS in 2007; observed shark research and fishing activities at FFS in 2009, and observed and assisted with PSD shark fishing activities at FFS in 2010.

Brendan Hurley worked for two field seasons at Woods Hole fishing for sharks and other species for size and weight data.

Ben Cook shark fished on a commercial fishing vessel off shore in South Carolina and captured bull sharks.

All field members are experienced with remote fieldwork with wildlife.

Shawn Farry has over 20 years of remote field camp experience in places such as Antarctica, Papua New Guinea, and Alaska. 2011 will be Shawn’s 8th field season in the NWHI spanning over a period of 18 years. Shawn’s large animal handling experience includes 8+ years capturing and handling Hawaiian monk seals which includes leading restraint on ~75+ adults; tagging hundreds of elephant seals including adult bulls, tagging hundreds of Weddell seals including the restraint of hundreds of 1000lb+ adults; capturing and handling dozens of wolves while working as the Interagency Field Team

Leader for the Mexican Wolf Program Recovery Program; experience trapping and handling black bears, badger, bobcat, mountain lions and hundreds of coyotes, as well as experience conducting very close proximity behavioral studies of Alaska brown bears. Combined with his experience with the shark project, he is well qualified to lead this activity.

Mark Sullivan has 4 seasons of experience observing Galapagos and tiger shark behavior at FFS including extensive experience observing both attempted and successful predation events. Mark has documented >50 shark bite injuries to Hawaiian monk seals including dozens of pup mortalities and necropsies due to shark wounds. Mark's large animal handling experience includes 4 years capturing and handling Hawaiian monk seals which includes assisting in the capture and tagging of ~50 adults.

Ben Cook is new to the NWHI but has extensive fieldwork in Peru, Wyoming, New Mexico, and Arizona. He has experience working with moose and grizzly bears and capturing and handling wolves and other mesocarnivores.

Brendan Hurley is also new to the NWHI. His remote field experience is primarily in Alaska. He has worked on several programs observing shark behavior and has captured and handled wild dolphins in Sarasota, FL.

Supplemental Information C: Safety Protocols for Shark Removal Activity

A lengthy Bang Stick safety protocol has been established and includes instrument ammunition prep and handling (including storage), stowage of bangstick aboard the small boat (if necessary), proper use of the bangstick on shore, loading of the bangstick, location on the body of the shark where the bangstick will be used, and instructions on how specifically to use the bangstick. Per this protocol, routine debriefs will occur among all HMSRP FFS crew after shark fishing excursions and minutes entered into the fishing log.

The Bang Stick protocol also contains detailed information on the processing of euthanized Galapagos sharks, including necropsy and gross gut content analysis, fatty acid, genetic, and vertebrae sampling, collection of desired shark remains for cultural practices, collection of bait for future fishing activities, and disposal of unused remains. Personnel are trained according to this protocol.

A Risk Assessment held in April 2009 on shark removal between HMSRP staff and HIMB staff identified discussed the following activities and mitigation actions related to the proposed methods.

1. Activity: Shark Handling

Hazards: entanglement in lines, blunt trauma from tail, abrasion from skin, crushing injuries, bite injuries, infections

Severity: ranges from minor abrasions, cuts and bruises (common) to major injuries or death (rare)

Mitigation: a clearly defined and understood protocol is followed when handling sharks, team members are assigned specific handling tasks and briefed on dangers. Wear long sleeve rash-guard type shirts to avoid abrading skin directly. Use long handled fly gaff to help restrain/secure shark near boat. Use cleats on boat if possible to help bring in line (i.e. run line around cleats to gain better purchase). Secure shark to boat with lines (side tow) and tow back to Tern Island for necropsy.

2. Activity: Shark Dispatching

Hazard: Injury during dispatch of shark with bangstick. Injuries include accidental shooting of self or other team member.

Mitigation: All personnel must receive training on bangstick operation. Bangstick never loaded until/unless shark is on line and ready to be dispatched (i.e. load bangstick immediately prior to shooting with it). Only trained personnel to operate the bangstick.

Papahānaumokuākea Marine National Monument
CONSERVATION AND MANAGEMENT Permit Application

NOTE: *This Permit Application (and associated Instructions) are to propose activities to be conducted in the Papahānaumokuākea Marine National Monument. The Co-Trustees are required to determine that issuing the requested permit is compatible with the findings of Presidential Proclamation 8031. Within this Application, provide all information that you believe will assist the Co-Trustees in determining how your proposed activities are compatible with the conservation and management of the natural, historic, and cultural resources of the Papahānaumokuākea Marine National Monument (Monument).*

ADDITIONAL IMPORTANT INFORMATION:

- Any or all of the information within this application may be posted to the Monument website informing the public on projects proposed to occur in the Monument.
- In addition to the permit application, the Applicant must either download the Monument Compliance Information Sheet from the Monument website OR request a hard copy from the Monument Permit Coordinator (contact information below). The Monument Compliance Information Sheet must be submitted to the Monument Permit Coordinator after initial application consultation.
- Issuance of a Monument permit is dependent upon the completion and review of the application and Compliance Information Sheet.

INCOMPLETE APPLICATIONS WILL NOT BE CONSIDERED

Send Permit Applications to:

Papahānaumokuākea Marine National Monument Permit Coordinator

6600 Kalaniana'ole Hwy. # 300

Honolulu, HI 96825

nwhipermi@noaa.gov

PHONE: (808) 397-2660 FAX: (808) 397-2662

**SUBMITTAL VIA ELECTRONIC MAIL IS PREFERRED BUT NOT REQUIRED. FOR
ADDITIONAL SUBMITTAL INSTRUCTIONS, SEE THE LAST PAGE.**

Papahānaumokuākea Marine National Monument Permit Application Cover Sheet

This Permit Application Cover Sheet is intended to provide summary information and status to the public on permit applications for activities proposed to be conducted in the Papahānaumokuākea Marine National Monument. While a permit application has been received, it has not been fully reviewed nor approved by the Monument Management Board to date. The Monument permit process also ensures that all environmental reviews are conducted prior to the issuance of a Monument permit.

Summary Information

Applicant Name: Frank Parrish, PhD and Alecia Van Atta
Affiliation: NOAA-NMFS-PIFSC/PIRO

Permit Category: Conservation and Management

Proposed Activity Dates: Renewal permit application to conduct same work as in 2010 for April 10, 2011- September 30, 2011

Proposed Method of Entry (Vessel/Plane): NOAA vessels- Oscar Elton Sette (April deployment), and possibly NOAA vessel Hi'ialikai, chartered vessel Kahana, chartered vessel Searcher, chartered flight via FWS, Air Pacific cargo (for August or September pick up and possibly resupply)

Proposed Locations: French Frigate Shoals

Estimated number of individuals (including Applicant) to be covered under this permit: 10

Estimated number of days in the Monument: 173 days

Description of proposed activities: (complete these sentences):

a.) The proposed activity would...
include monitoring of shark activity at select pupping sites and the removal of predatory sharks from these areas. The proposed activity would support the recovery of the Papahānaumokuākea Marine National Monument's endangered Hawaiian monk seals by reducing the likelihood of shark predation on seal pups at French Frigate Shoals. This activity, when combined with other conservation efforts, would help address the problem of low juvenile seal survival, a factor identified as one of the main causes of Hawaiian monk seal population decline in the Monument.

b.) To accomplish this activity we would
Monitor shark presence around pupping sites by observation from the ground, an observation tower, remote cameras and/or patrolling near shore waters from a small boat (remote camera installation is permitted separately). Sharks observed in patrolling or predatory behavior would then be caught by the following methods approved for use this applicant at this location in the past (e.g. 2009): 1) hand line, 2) hand-held harpoon, 3) drum-line, and/or 4) small 5-hook

bottomset that was used by C. Meyer at FFS in 2009 and 5) the "Net Surprise". For all methods, hooked or netted sharks will be pulled into shore or along side a small boat, tail-rope and killed with a bang stick. Shark carcasses will be examined and desired remains retained to fulfill Native Hawaiian practices and to conduct scientific analyses; thereafter, remains will be retained for bait or disposed of at deepwater locations outside of the atoll.

c.) This activity would help the Monument by ...

Conducting activities identified in the Papahānaumokuākea Marine National Monument Management Plan (December 2008, hereinafter referred to as MMP) Priority Management Needs: 3.2 Conserving Wildlife (Hawaiian monk seals), and 3.3 Reducing Threats (predation) to Monument Resources (Hawaiian monk seals), as well as the Co-Trustee's Conservation & Management Activity: Natural Resource Protection, as listed in section 6.3 of that Monument permit application.

The Co-Trustees, including NOAA, aim to accomplish natural resource protection by conducting "...management actions to promote the conservation of Monument resources which includes activities necessary to carry out protection of species, such as carrying out existing recovery plans" to fulfill our obligations under the Endangered Species Act (MMP page 11). The activity of removing Monument wildlife (aggressive male monk seals) that threatens a Monument natural resource (monk seal pups) is listed in that permit application. However, the activity of removing sharks is not, thus, the origination of this permit application.

In this application, we propose to monitor shark activity and remove sharks as a means of managing the threat of shark predation and thereby protecting Hawaiian monk seal pups, and thereby increasing the chances these pups will grow to adults and reproduce. Increased survival of pups is necessary to the species recovery. Monitoring shark activity and removing sharks are both listed in the Hawaiian Monk Seal Recovery Plan (NMFS 2007) as necessary activities, critical to the species' recovery.

Other information or background:

A comprehensive 100-page Technical Memorandum titled "Shark Predation on Hawaiian Monk Seals II" details the lengthy history of shark predation of monk seal pups at French Frigate Shoals, predation mitigation and research activities undertaken to date, as well as a summary of the proceedings of a workshop conducted in November 2008 with various stakeholders (including the Monument, USFWS, State of Hawaii DLNR and leading shark experts) (Gobush 2010). This memorandum serves as a reference of the information, background and best-available science to date on the issue. To avoid an overly lengthy Conservation & Management application here, the Executive Summary of the memorandum is included below. A summary of the 2009 and 2010 field season's findings follows.

EXECUTIVE SUMMARY

The technical memorandum is divided into three sections. Section 1 summarizes the proceedings of the second workshop on Shark Predation on Hawaiian Monk Seals sponsored by the Hawaiian

Monk Seal Research Program (HMSRP) of the Pacific Island Fisheries Science Center (PIFSC) and also the Pacific Islands Regional Office (PIRO) of the National Marine Fisheries Service (NMFS). Section 2 reviews knowledge to date about shark predation on pre-weaned and newly weaned monk seals pups (*Monachus schauinslandi*) and NMFS' mitigation attempts at French Frigate Shoals (FFS) and elsewhere in the Northwestern Hawaiian Islands (NWHI), and provides a more comprehensive picture of the issues than time-permitted at the workshop. Section 3 summarizes HMSRP's premises about the nature of shark predation based on peer-reviewed science, inferences, expert opinions and field experience. HMSRP's positions on controversial aspects of the issue are stated and a number of appendices are included that detail plans to be executed in 2009 and mitigation ideas for the future.

Workshop II

Workshop II was held on November 5-6, 2008 in Honolulu, Hawaii. Representatives from the NMFS-PIFSC, NMFS-PIRO, Papahānaumokuākea Marine National Monument (the Monument), US Fish and Wildlife Service (USFWS), State of Hawaii Department Land and Natural Resources (DLNR), Marine Mammal Commission (MMC), and Hawaiian Monk Seal Recovery Team participated. The primary goal of this workshop was to exchange ideas and opinions from different management and scientific perspectives about the predation problem and suggest a logical course of action. Presentations describing the endangered status of the Hawaiian monk seal, the shark predation problem at FFS, and the first workshop on the issue set the stage for the second workshop's discussions. Hawaiian Institute of Marine Biology (HIMB) scientists reviewed past shark research in FFS, reported the results of their 2008 research efforts, and presented their research plan for 2009 aimed at gathering fine-scale movement data on sharks. HMSRP described 2008 mitigations activities and mitigation strategies for the future. The 2008 mitigation strategy focused solely on the application of a suite of deterrents and devices around Trig Island and translocation of weaned pups to "safe" islets, although lethal removal of select sharks had also received support at the Workshop I.

Outcomes of Workshop II included an evaluation of past research efforts, development of definitive statements about the predation problem agreed upon by all workshop participants, identification of knowledge gaps, and a prioritized list of suggested actions for upcoming field seasons. Workshop participants encouraged improved deterrent design, improved and informed removal of sharks displaying predatory behavior, and a need for analyses on past data and the collection of additional data on seal and shark behavior. Ideas, such as the use of barriers to keep sharks away from near shore areas and sonic tagging pups, were discussed and their development recommended.

Knowledge to Date About the Shark Predation at FFS and its Mitigation

The genus *Monachus* is in crisis; with just two extant representative species, the Hawaiian monk seal offers the best chance of its persistence. However the Hawaiian monk seal population itself is heading towards extinction. Numerous threats afflict the species across its range. Shark predation on pre-weaned and newly weaned pups contributes to a unique and extreme situation at FFS that peaked in 1997-1999 and stands out from the trends observed at other sites in the

NWHI. Since then, predation has declined to 6-11 pups a year, an unsustainable rate due to falling birth rates. Galapagos sharks (*Carcharhinus galapagensis*) and tiger sharks (*Galeocerdo cuvier*) both potentially feed on marine mammals; however, HMSRP has only observed Galapagos sharks attacking and killing pups in near shore water. Mitigation activities by HMSRP conducted over the last decade include harassment of sharks, intensive observation, translocation of weaned pups, deployment of devices to deter predation and shark removal (see 2009 findings at the end of this Executive Summary below).

HMSRP Premises, Positions and Post-workshop Developments

HMSRP has developed premises about the identity and number of sharks likely involved, shark wariness to human activity, and opinions about shark culling based on peer-reviewed science, inference, expert opinion and ample experience with the situation at FFS. Post-workshop, HMSRP systematically compared all mitigation actions proposed, detailing the potential benefits and drawbacks based on its premises, positions, Workshop recommendations and stakeholders' perspectives. A 2009 field plan was created that included: 1) logistical and financial support for HIMB shark scientists to conduct shark tagging studies at FFS, 2) the systematic application and comparison of 3 treatments (human presence, deterrents and a control) at 2 pupping sites, 3) the design and installation of a custom-made remote surveillance camera system on 1 pupping site, and 4) additional behavioral monitoring of sharks and seals.

Summary of 2009 Findings

In 2009, 34 monk seal pups were born, 20 weaned and 8 were lost to shark predation at FFS (NMFS, unpublished data). On Trig islet, Galapagos shark predatory activity was observed on 13 occasions during 28 camping days; additional attacks were recorded via remote camera. Shark predatory activity at Trig resulted in 6 incidents: 5 confirmed attacks on 5 pups (as evidenced by direct observation and presence of 1-6 shark-inflicted wounds on each pup), and 1 shark-induced mortality of a pup (i.e. the otherwise healthy pup's suspicious disappearance met our conservative criteria for shark-inferred mortality, see Appendix C of Technical Memorandum).

The incidence of shark predation was compared across three experimental treatments capitalizing on an apparent wariness of sharks experienced in the past. Treatments included 24-hour human presence, visual and auditory devices aimed to deter shark activity, and a control (no humans, no deterrents) at two pupping sites. Through the systematic application of these treatments, no significant difference in shark incidents existed across treatments (Trig only- Pearson's Chi square 3.5, $p = 0.17$, 94 days; Trig & Gin- Pearson's Chi square 2.5, $p = 0.28$, 140 days). The pattern of shark incidents appeared to be independent of device/deterrent placement at Trig. For example, a 36-day period with no shark incidents occurred in 2008 with the maximal deterrent effort and a 41-day period with no shark incidents occurred in 2009 with alternating deterrent effort. The number of pups attacked at Trig Island differed little when compared over the 3 years. In 2007, a year with no devices, 5 (27.8%) pups were attacked. In 2008, a year with devices for most of the season (until they failed to operate), 4 (25%) pups were attacked. In 2009, a year with devices for part of season (i.e. devices were deployed during the 'device

treatment', totaling 28 days), 6 (31.3%) pups were attacked. Sharks were sighted on 10 of 35 days during the human presence treatment at Trig and Gin islets, demonstrating that sharks' wariness to humans is variable, unpredictable, possibly individualistic and unreliable at these locations. The hypothesis that a lower percentage of pups born will succumb to shark predation when devices/deterrents are deployed compared to previous years was not supported. The hypothesis that fewer shark incidents will occur when humans are present or devices are deployed versus control periods was also not supported.

A pup behavioral study was conducted in 2009; 132 hours of scan sampling observations (on a 15-minute interval, totaling 528 scans) were recorded, primarily of mother-pup nocturnal activity (between 1800 to 1000 hours). A preliminary review of the data indicates that 14% of the time (75 occasions/scans), pups was in the water; 84% of these water entries were into the wave wash, the area where the water laps the shore. While in the water (wave wash or farther), pups were with their mothers 100% of the time and on 97.3% of those occasions/scans they were within 1 meter of her (for 2.7% of the occasions/scans they were within 2 meters of her). The maximum distance a seal pup ventured into the water was 50 meters from shore at Gin (1 occasion/scan) and 20 meters from shore at Trig (3 occasions/scans). These findings support the idea that seal pups enter the water infrequently at night and primarily do so to thermoregulate in the company of their mothers rather than to swim far into the ocean alone.

HMSRP logistically and financially supported a Galapagos and tiger shark tagging study conducted by Carl Meyer, PhD. of HIMB. Across the pupping season (May-August), 189 5 to 10-hook bottomsets were made; totaling 1570 hooks and 6850 soak hours. These bottomsets used large tuna heads and shark tissue as bait. Bycatch was minimal and limited to elasmobranch species. In total 68 Galapagos and 40 tiger sharks were tagged with sonic tags; additional individuals were tagged with spaghetti tags. Four Galapagos sharks were tagged near islets with monk seal pups (5.9% of the sampled population captured in a stratified fishing scheme that attempted to evenly fish across shallow and deep lagoonal areas and deep areas outside the breaking reef at FFS). HMSRP's human observations and video recordings and Meyer's tagging success support the hypothesis that a small subset of Galapagos sharks is primarily responsible for the predation of pups.

This tagging research represents the greatest effort in terms of time devoted to and catch success of sampling the shark population FFS to date (aside from commercial fishing in 1999). None of these tagged Galapagos sharks were present at Trig island during the video recordings of Galapagos shark attacks on pups or during the night the one pup disappeared that was inferred to be shark-caused at this location in 2009. Together these findings suggest that 1) using a small bottomset is a very effective way of capturing sharks and avoiding bycatch; 2) very few sharks utilize the shallow waters around the pupping sites; 3) catching sharks that are likely to prey on pups requires nearshore fishing (i.e. setting gear closer to the islets than what Carl Meyer's crew accomplished). However, it should be noted that a minimum depth and sandy substrate conditions are required to employ the 5-10 bottomset fishing method.

Summary of 2010 Activities

In 2010, 36 monk seal pups were born, 17 weaned and successfully survived and 8 were lost to shark predation at FFS (2 pups died from other causes or are still nursing as of August 23, 2010) (NMFS, unpublished data). On Trig islet, Galapagos shark predatory activity was observed on 2 occasions during onsite monitoring by staff and/or recorded with the remote video camera. To increase the chance of observing sharks, staff camped on Trig as much as was feasible; however shark sightings remained rare, especially after an incident on 7/9/2010 (the last incident at Trig) and the removal of a Galapagos shark at Trig on 7/13/10 (see description below). Shark predatory activity at Trig resulted in 4 incidents between 6/10/10 and 7/9/10: 3 confirmed lethal attacks on pups (as evidenced by direct observation and presence of shark-inflicted wounds on each pup), and 1 shark-induced mortality of a pup (i.e. the otherwise healthy pup's suspicious disappearance met our conservative criteria for shark-inferred mortality, see Appendix C of Technical Memorandum. In this case, an 8-foot Galapagos shark was observed swimming in the area near the searching mother seal). At the Gins, 4 pups also met the same criteria for shark-induced mortality between the dates of 7/2/10 and 8/10/10.

Two shark fishers were hired to fulfill the objectives of the PNMM permit granted in June 2010. These two staff and 3 invited members of the Native Hawaiian community deployed on a chartered vessel, the Kahana, bound for FFS; the cruise dates were from July 5 through July 11, 2010. The vessel's course was based on the suggestions by the members of the Native Hawaiian community, which included timed arrival at select islands. The course included a visit to Ka'ula rock to perform the Mano i'a Harvest Ceremony at approximately noontime on July 6, with the ship stationed off a cave on the northwest side of the rock. Hawaiian greetings were chanted from the vessel during two morning circumnavigations around Nihoa Island, as well as at Mokumanamana during the night as the ship passed by en route to Tern Island, FFS. The stay at Tern Island, FFS was extended by a few hours beyond the scheduled drop-off of supplies and personnel to perform a second Manu i'a Harvest Ceremony. Our shark staff, monk seal staff, as well as the Refuge manager and other Fish & Wildlife staff participated in the ceremony, lead by the members of the Native Hawaiian Community.

Beginning on 10 July, the shark fishers focused their efforts at Trig because this was the islet with the greatest number of nursing pups to protect for the entire season. The fishers also surveyed the waters around the Gins to document the micro-geography around these islets (depths, substrate and currents) in the event that fishing might occur there in the future.

At Trig Island, monitoring of sharks occurred via camping and video recording. The fishing effort initially focused on off-shore activities. Bottomsets and drumlines were deployed according to the permit's provisions with staff observing from island ready to alert the fishers (who were in their small boat monitoring the off-shore gear) of any near-shore shark activity. No near-shore Galapagos shark activity or shark incidents at Trig were observed between July 9 and August 23, 2010. Thirty-four days of fishing occurred at Trig with 413 bottomset hook hours and 519.5 drumline hook hours (as of 8/23/2010). One Galapagos shark was captured via the bottomset on the third day of fishing; the male shark (165cm total length) was euthanized with a bang stick, sampled (muscle, liver, stomach contents, skin clipping) and skin and teeth retained and preserved for Native Hawaiian community members. Remaining tissue was used as bait for subsequent fishing efforts.

Within the first few days of fishing activities, the shark fishers ground-truthed the depth and substrate condition of a 400 meter zone around Trig via global positioning device to ensure that bottomsets were made within in the specified zone of the permit. Because the micro-geography was not well known at the Gins relative to Trig, extra effort went toward documenting depths, currents qualities and substrate type around these two islets also. It was learned that water depth 400 m from Trig Island was only 12-14 feet, not 25 feet as indicated by nautical charts which had been the basis for developing the 2010 permit application. Bycatch was minimal and all non-target fishes caught were released alive (3 ulua, 1 whitetip shark and 3 tiger sharks). In addition, 2 tiger sharks took bait, bent the hooks and escaped, and therefore were not considered true bycatch. No monk seals or turtles showed interest in gear or bait. HMSRP's human observations, video recordings and low catch success at Trig given near identical bottomset procedures as Carl Meyer used in 2009 provide continued support for the long-standing hypothesis that a small subset of Galapagos sharks is primarily responsible for the predation of pups. It is also noteworthy that tiger shark hooking at Trig occurred throughout the 34 days of fishing reported here (5 incidents) and this tiger shark presence was not coincident with predation activity.

Section A - Applicant Information

1. Applicant

Name (last, first, middle initial): Parrish, Frank and Alecia Van Atta

Title: Chief of Protected Species Division, Pacific Islands Fisheries Science Center, NMFS, NOAA and Assistant Regional Administrator, Protected Resources Division, Pacific Islands Regional Office, NMFS, NOAA

1a. Intended field Principal Investigator (See instructions for more information):

Shawn Farry

2. Mailing address (street/P.O. box, city, state, country, zip):

NOAA-Hawaiian Monk Seal Research Program

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

For students, major professor's name, telephone and email address:

3. Affiliation (institution/agency/organization directly related to the proposed project):

NOAA-NMFS-PIFSC-PSD and NOAA-NMFS-PIRO

4. Additional persons to be covered by permit. List all personnel roles and names (if known at time of application) here (e.g. John Doe, Research Diver; Jane Doe, Field Technician):

Charles Littnan, PhD, HMSRP Director

Jason Baker, PhD, Marine Biologist, [REDACTED]

Kathleen Gobush, PhD, Research Ecologist; [REDACTED]
Jeff Walters, Monk Seal Recovery Coordinator; [REDACTED]
Shawn Farry, PIFSC Contractor; [REDACTED]
Mark Sullivan, PIFSC Contractor; [REDACTED]
TBA

Section B: Project Information

5a. Project location(s):

<input type="checkbox"/> Nihoa Island	<input type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input type="checkbox"/> Deep water
<input type="checkbox"/> Necker Island (Mokumanamana)	<input type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input type="checkbox"/> Deep water
<input checked="" type="checkbox"/> French Frigate Shoals	<input checked="" type="checkbox"/> Land-based	<input checked="" type="checkbox"/> Shallow water	<input type="checkbox"/> Deep water
<input type="checkbox"/> Gardner Pinnacles	<input type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input type="checkbox"/> Deep water
<input type="checkbox"/> Maro Reef			
<input type="checkbox"/> Laysan Island	<input type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input type="checkbox"/> Deep water
<input type="checkbox"/> Lisianski Island, Neva Shoal	<input type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input type="checkbox"/> Deep water
<input type="checkbox"/> Pearl and Hermes Atoll	<input type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input type="checkbox"/> Deep water
<input type="checkbox"/> Midway Atoll	<input type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input type="checkbox"/> Deep water
<input type="checkbox"/> Kure Atoll	<input type="checkbox"/> Land-based	<input type="checkbox"/> Shallow water	<input type="checkbox"/> Deep water
<input type="checkbox"/> Other			

Ocean Based

NOTE: There is a fee schedule for people visiting Midway Atoll National Wildlife Refuge via vessel and aircraft.

Location Description:

Vicinity of Trig, Round and Gin islets

5b. Check all applicable regulated activities proposed to be conducted in the Monument:

- ☒ Removing, moving, taking, harvesting, possessing; injuring, disturbing, or damaging any living or nonliving Monument resource
- ☐ Drilling into, dredging, or otherwise altering the submerged lands other than by anchoring a vessel; or constructing, placing, or abandoning any structure, material, or other matter on the submerged lands
- ☒ Anchoring a vessel
- ☐ Deserting a vessel aground, at anchor, or adrift
- ☒ Discharging or depositing any material or matter into the Monument
- ☐ Touching coral, living or dead
- ☒ Possessing fishing gear except when stowed and not available for immediate use during passage without interruption through the Monument
- ☒ Attracting any living Monument resource
- ☐ Sustenance fishing (Federal waters only, outside of Special Preservation Areas, Ecological Reserves and Special Management Areas)
- ☐ Subsistence fishing (State waters only)
- ☐ Swimming, snorkeling, or closed or open circuit SCUBA diving within any Special Preservation Area or Midway Atoll Special Management Area

6 Purpose/Need/Scope *State purpose of proposed activities:*

The purpose of the proposed activity is to support the recovery of the Monument's endangered Hawaiian monk seals by reducing the likelihood of shark predation on seal pups at French Frigate Shoals. This activity, when combined with other conservation efforts, would help address the problem of low juvenile seal survival, a factor identified as one of the main causes of Hawaiian monk seal population decline in the Monument.

To achieve the purpose stated above, we propose to monitor shark activity via human and/or remote camera observation at Trig, Gin, Little Gin and Round islets when Hawaiian monk seal pups are present to determine when predatory activity commences and what species of sharks are involved (remote camera installation is permitted separately).

We also propose to remove sharks observed to be pursuing, injuring or killing pups or are observed to be patrolling within 700m of the shoreline of Trig, Gin, Little Gin and Round islets during the pupping season. The purpose of these actions is to mitigate predation of Hawaiian monk seal pups. These actions are recommended in the species' Recovery Plan to mitigate predation and are deemed necessary for the recovery of the FFS monk seal subpopulation (NMFS 2007).

A range of methods will be used to capture these sharks since sharks are known to be unpredictable, individualistic predators that are often difficult to catch. A 700-meter distance from shore encompasses water depths of approximately 25 ft that allow replications of Meyer's methods and success. Meyer's methods require setting gear over a sandy bottom. Our ground-truthing in 2010 of substrate maps and areal photos of the area indicates that this ideal sandy bottom type is located within the requested 700m distance.

Captured sharks will be humanely killed with a bang stick. We request that Native Hawaiian community members be present to oversee and/or participate in these actions as deemed desirable and appropriate by the Office of Hawaiian Affairs and suggest a replication of the practices that occurred on the deployment cruise in 2010 at the least.

We aim to limit shark removals to Galapagos sharks (*Carcharhinus galapagensis*), based on HMSRP's observations over the last 10 years. This is the only shark species HMSRP has positively identified pursuing, injuring or killing pups from 1997 to present (prior to this time period, such observations were not recorded because predation levels were exceedingly low). However, USFWS recommended that removals not be limited to species but limited by behavior (i.e. any shark in active predation) in their memorandum dated April 17, 2009.

We aim to remove a maximum of 19 sharks between May 1 and September 30, 2011 to fulfill the quota of 20 sharks that was permitted in 2010. Translocation of weaned pups within French Frigate Shoals from high shark predation risk islets will be conducted under a separate permit.

HMSRP will perform a necropsy on culled sharks, including gut content inspection, morphometric measurements, and identification of sex and reproductive state. The deceased shark remains will be retained for Native Hawaiian cultural uses or practices as deemed desirable

and appropriate by the Office of Hawaiian Affairs and as allowed under applicable Monument regulations. These desired remains will be removed from the carcass after the necropsy and stored frozen. Thereafter, any remains will be retained for shark ecologists (e.g. Carl Meyer, PhD, Jennifer Schultz, PhD, R. Dean Grubbs, PhD, Greg Skomal, PhD) for scientific analyses (e.g. gut content and tissue analysis, vertebrae isotope analysis, fatty acid analysis, genetic analysis of the shark itself and its gut contents). Remains applicable to these tests will be removed from the carcass after the necropsy and stored frozen. Any remaining shark tissue will be disposed at multiple deepwater locations outside of the atoll or stored frozen and used for bait for future removal attempts that season.

7. Answer the Findings below by providing information that you believe will assist the Co-Trustees in determining how your proposed activities are compatible with the conservation and management of the natural, historic, and cultural resources of the Monument:

The Findings are as follows:

a. How can the activity be conducted with adequate safeguards for the cultural, natural and historic resources and ecological integrity of the Monument?

The activity can be conducted with adequate safeguards for the cultural, natural and historic resources and ecological integrity of the Monument. Prior to obtaining the permit for this work and to receive quality input, HMSRP consulted with Office of Hawaiian Affairs Monument Management representative, Heidi Guth, on several occasions and presented our preliminary plans at a Native Hawaiian Cultural Working Group in a meeting held in March 2010. We believe constructive feedback was offered to us at this meeting and we left with an improved understanding of the views of some representatives of the Native Hawaiian community on our proposed work. An outcome of this meeting was a suggestion to partner with a Native Hawaiian community representative, Keoni Kuoha, in order to include Native Hawaiian practices in our work going forward.

Thus, to safeguard the cultural resources, we included a Native Hawaiian practitioners on a deployment cruise to initiate the same work in 2010. A range of practices and prayers were made that included our staff on a custom-design cruise course from O'ahu to FFS. We request that similar activities occur in 2011 and we also plan to invite these or other practitioners to observe and/or participate in the shark removals, as well as

retain remains of shark carcasses for the Native Hawaiian community as they deem desirable and that is logistically feasible. It was a pleasure to work with the members of the Native Hawaiian community in 2010 as described here. We believe that this collaboration has deeply enriched the experience of our staff and fortifies our efforts to conserve the Hawaiian monk seal.

We will continue to welcome and greatly appreciate input from the Native Hawaiian community at any time. NMFS has recently obtained the services of a contractor to plan and conduct liaison activities between NMFS and Native Hawaiian leaders and practitioners in support of Hawaiian monk seal recovery. We believe this will help further enhance integration of Native Hawaiian practices and protocols with our research and recovery efforts, including the activities proposed in this permit application. This enhanced integration will include further consultations with Native Hawaiian leaders and practitioners regarding cultural protocols and fishing procedures associated with this application. We also look forward to our staff attending a Hawaiian cultural briefing and reviewing cultural literature provided by OHA prior to any activities being conducted.

The overall objective of this Conservation & Management permit application is to fulfill needs of the Monument: to conserve wildlife (Hawaiian monk seals) and to reduce threats (shark predation) to Monument resources (Hawaiian monk seals). To further safeguard natural resources, we propose to limit the scope of our removal actions to 19 sharks observed to be patrolling, pursuing, injuring or killing pups within 700m of Trig, Gin, Little Gin and Round islets during the main pupping season only (May 1-September 30, 2010). We would like to limit the species culled to Galapagos sharks, but would respect the wishes of USFWS on the matter. With respect to Galapagos sharks, the removal of a combined total of 20 individuals from the FFS represents a small percentage of the atoll's population (actual percentage depends on which abundance estimate is used). Carl Meyer abundance estimate puts the FFS Galapagos shark population in the hundreds or low thousands.

Historic resources under the NHPA would not be affected or potentially affected by our proposed actions.

To safeguard the ecological integrity of the Monument, we propose to limit the scope of our removal actions as described above and also to avoid by-catch of any other wildlife to the greatest degree possible. Possible adverse effects on the coral reef ecosystem at FFS from shark removals were investigated using the EcoSim model (Parrish, unpublished data; NMFS, in preparation). Results from that work indicated that the removal of 20 sharks had a nearly imperceptible effect on the dynamics of the FFS ecosystem. Expert opinion at our shark predation workshops supported these modeled results (NMFS, in preparation). With respect to bycatch, across a total of 894.5 hook hours, 3 ulua, 1 reef shark and 2 tiger sharks were caught and all released live. No monk seals or turtles showed interest in our gear or bait.

b. How will the activity be conducted in a manner compatible with the management direction of this proclamation, considering the extent to which the conduct of the activity may diminish or enhance Monument cultural, natural and historic resources, qualities, and ecological integrity, any indirect, secondary, or cumulative effects of the activity, and the duration of such effects? Shark monitoring and removals will be conducted in a manner compatible with the management direction of this proclamation. As stated previously, the objective of these activities is to conserve wildlife and reduce a threat to a Monument natural resource (Monument management needs 3.2. and 3.3). Also, these activities would facilitate the Monument's mandate to maintain biodiversity.

The extinction of the Hawaiian monk seal at FFS would adversely affect the Monument's biodiversity and trophic structuring at this location. A failure to mitigate the significant threat of shark predation may advance the potential for extinction and prevent recovery. Other methods executed in an attempt to reduce this threat have failed; it is believed that the activities proposed here will reduce the threat.

c. Is there a practicable alternative to conducting the activity within the Monument? If not, explain why your activities must be conducted in the Monument.

In terms of alternative locations, there are no practicable alternatives to conducting shark removals in the Monument. This proposed activity could only occur within the

Monument because we seek to mitigate this specific source of mortality for this specific subpopulation of monk seals in order to facilitate its population growth and recovery. Losing a high number of pre-weaned and newly weaned pups to shark predation is by and large a unique phenomenon at French Frigate Shoals only; therefore, we propose to manage this threat at this location only.

d. How does the end value of the activity outweigh its adverse impacts on Monument cultural, natural and historic resources, qualities, and ecological integrity?

The potential positive outcomes from enhanced monk seal recovery outweigh the adverse impacts associated with the loss up to 20 Galapagos sharks (combined for 2010 and the 19 we propose for 2011) because we believe that these actions will ensure the co-existence atoll-wide of the 2 species into the future.

If predation is not mitigated, the monk seal population may decline to a level that is unable to overcome demographic or environmental stochasticity. If a total of 20 Galapagos sharks are culled, a higher number of pups are expected to survive to be candidates for translocation and/or survive on their own to adulthood than would be the case if predation were not mitigated.

Increasing the number of juvenile seals reaching adulthood augments the population numbers in the short-term and if they are female, its reproductive potential in the long run. At least 198 pups have been maimed and/or have died in their first months of life due to shark predation since the initial upsurge in FFS shark predation (starting in 1997). This is a minimum estimate based on highly conservative criteria established by HMSRP to determine cause of death (see Appendix C of the Technical memorandum). To give some context, 198 individual monk seals were identified at FFS in 2009 and the total estimated number of pups born in the six main NWHI subpopulations in 2009 was 118 individuals. If over the last decade, these 198 FFS pups had successfully weaned, a percentage would have likely been later killed by sharks, starved or become entangled in their first year of life. However, even if 20 female pups had survived, the status of the FFS population would currently be more favorable. Each breeding female is extremely valuable to the population at current population levels and birth rates.

We do not believe that other, secondary, impacts are likely to result from the removal because Galapagos sharks and other apex predators are relatively abundant compared to monk seals (see discussion above on abundance).

e. Explain how the duration of the activity is no longer than necessary to achieve its stated purpose.

The activity is scheduled to coincide with the primary pupping season.

f. Provide information demonstrating that you are qualified to conduct and complete the activity and mitigate any potential impacts resulting from its conduct.

Experienced shark fishers/researchers were contracted in 2010. They conducted the activities outlined in the 2010 permit and gained familiarity with the geography of FFS, as well as the monk seals, the shark community and other wildlife. These same or comparably skilled staff will carry out the work proposed for 2011.

In 2009, HMSRP conducted a Risk Assessment on shark fishing with Carl Meyer, his students and Bill Putre of NOAA (March 2009). During the 2009 field season, HMSRP accompanied Carl Meyer's shark tagging crew in FFS to learn shark capturing and handling techniques. In addition, the shark fishers deployed in 2010 were instructed in this Risk Assessment and participated in firearms safety class (though the bang stick is not considered a true firearm) by KOA Services Inc.

g. Provide information demonstrating that you have adequate financial resources available to conduct and complete the activity and mitigate any potential impacts resulting from its conduct. The HMSRP has annually received funding adequate to perform the activity. If additional funds were required to mitigate any unexpected impact, resources would be available from NMFS PIR or NMFS Office of Protected Resources.

h. Explain how your methods and procedures are appropriate to achieve the proposed activity's goals in relation to their impacts to Monument cultural, natural and historic resources, qualities, and ecological integrity.

The proposed removal methods and gear were all approved previously for past permit applications (including 2010).

The proposed procedures (i.e. scope, timing, location, numbers, species of sharks to be culled) are appropriate to reach a goal of conserving wildlife (Hawaiian monk seals) and reducing the threat (shark predation) on a Monument resource (Hawaiian monk seals) based on the best-available knowledge about shark abundance, shark movement, shark predation, predation mitigation, seal behavior, seal movement, fishing catch rates and fishing success rates (given location) at FFS. Please see Gobush (2010) for a comprehensive description of this knowledge. Adverse impacts to Monument cultural, natural, historic resources and ecological integrity are minimized as described in the discussion above.

Based on the experiences and success of past shark-capturing crews at FFS, shark ecologists and fishing gear-makers, having a variety of fishing methods at our disposal is advisable. The fishing crew will not know ahead of time which method will work best. Based on hours of observation from the tower in 2001-2003 and also video recording in 2009 - 2010 at Trig islet, Galapagos sharks come into the wavewash and attack pups, circling out away from shore into deeper water for about ~20 minutes and often reappearing in the wavewash for another try at a pup, at varying times of day and of the season, in varying numbers and at varying frequencies. These sharks also appear to respond to human activity in various ways (i.e. wary versus not

wary). For example, in 2009, attacks were most frequent in early morning hours, often for up to an hour, by Galapagos sharks that did not appear to be affected by the presence of human campers onshore. In 2010, once a Galapagos shark was captured and euthanized at Trig islet, no sightings of Galapagos shark or attacks on pups occurred for the rest of the season at this islet. In sum, the crew needs to be able to respond to the situation and the unpredictable and individualistic nature of sharks if they are going to have a chance at being successful.

i. Has your vessel has been outfitted with a mobile transceiver unit approved by OLE and complies with the requirements of Presidential Proclamation 8031?

The NOAA vessel R/V Oscar Elton Sette has been so equipped.

j. Demonstrate that there are no other factors that would make the issuance of a permit for the activity inappropriate.

There are no other factors that would make the issuance of a permit for the activity inappropriate. This Conservation & Management permit renewal application is a replication of the permitted activities in 2010. The 2010 permit application evolved from previous projects, which underwent extensive review in-house, by members of the Hawaiian Monk Seal Recovery Team, the USFWS, and the State of Hawaii. The purpose, scope, methods and protocol of this application mirror and/or build upon the activities, insights and experiences of these previous projects.

8. Procedures/Methods:

This project encompasses two main components: shark monitoring and shark removals.

A. Shark Monitoring

Observation from the ground by overnight campers, a tower, patrolling small boats and remote cameras will be the primary methods of monitoring shark presence and movement patterns at the pupping sites (Trig, Gin, Little Gin and Round islets).

Ground observation will occur by staff on island. For Trig and Gin islets, staff will have the option of overnight camping, as was done in 2010, in order to observe early morning or late evening shark activity. The footprint of the camp will be minimal for 1-2 people to basically sleep, cook camp food and have safety equipment by their side. Camping occurred in 2010 with no adverse reaction by monk seals or green sea turtles were observed. The 2010 permit limited camping to 7 consecutive days. We request lifting this cap on consecutive days, as longer camping periods may be desired and the greatest potential for wildlife disturbance is likely during camp set up. Lifting the 7-day cap would reduce the number of times camp would have to be set up and broken down.

The tower is a 12-foot structure made of scaffolding that may be erected on Trig, located approximately 40 meters from the south end of the island to improve visibility as needed. It was approved in 2010.

The installation of a remote camera recording systems on islets will allow shark observation during days and times when HMSRP staff are not present; their installation a part of another permit application. One was successfully installed on Trig in 2009 and 2010. Footage can be viewed nearly real-time from Tern and also reviewed on a daily or weekly basis as needed to help understand the shark predation patterns at that islet as the 2010 season unfolds.

For all observations, shark sighting/attack data, including identifying characteristics and behaviors, will be recorded on a standardized data form that was used in the 2009 -2010 field seasons.

B. Shark Fishing/Removals

1. Fishing personnel and location:

A crew of 2-3 staff experienced in safe and effective methods for shark fishing/removal will be tasked with shark monitoring and culling Galapagos sharks that they encounter within 700m of shore of Trig, Gin, Little Gin and Round islets. As such, capturing sharks will only occur in what is considered the shallow lagoon inside the atoll in close proximity to islets with the highest rate of shark predation. Handlines, harpoon, and the "Net Surprise" will be used in shallow water, from shore or close to shore; bottomsets and drumlines will be used in deeper water, over sandy substrate at distances farther from shore (up to 700m away). Ability to set the gear as far out as 700m from shore will help ensure that it performs as designed by Meyer in 2009. Shallow depth, coral and snags make setting the bottomset at closer distances a challenge. We learned this first-hand in 2010 because water depth was only 12-14 feet at 400m off the south side of Trig (the side of Trig I. in which a Galapagos shark was sighted patrolling near-shore), whereas the Meyer 2009 bottomset design is for greater water depths (approximately 25 feet).

2. Fishing Methods:

Five different methods will serve as a "toolbox" of options to safely cull a maximum of 19 Galapagos sharks: handline, harpoon, bottomset, drumline and the surprise net. Each method has its advantages and drawbacks. The potential for shark wariness to humans in combination with extremely low CPUE near pupping sites indicates that such a "toolbox" is needed to successfully capture sharks at the numbers and in the areas we desire.

Handlines and harpoons have the advantage of being very specific; bottomsets with large hooks and bait were shown to be highly effective in 2009 across the atoll (i.e. Carl Meyer's crew caught 78 Galapagos sharks in the 2009 season), and drumlines and the "Net Surprise" hold promise.

Bottomsets and drumlines are, by design, restricted by habitat characteristics, otherwise lines can get tangled, etc. Thus, bottomsets and drumlines are not recommended to be effective in very

shallow depths. Bathymetry and currents are islet-sector specific; therefore, the distance from shore to achieve a feasible depth and appropriate substrate (sandy bottom) is also islet-sector specific; a zone of 700m around each islet will provide for this. A 700m distance is an increase in distance from what was permitted in 2010 (400m). In 2009, an approximate zone of fishing of 400m from shore (at Trig) was proposed and granted based on the understanding that this distance encompassed 25-foot depth, comparable to Carl Meyer's bottomset design. We request this correction in distance based on the finding that the maximum depth at 400m is only 14 feet, not 25 feet. This was discovered via ground-truthing nautical chart depths with a Global positioning device. The maximum depth of only 14 feet means bait is close to the surface and this could contribute to shark detection of above-water gear and staff and contribute to wariness. The possible advantage of laying bait by bottomset is thus neutralized if the baited hooks are too close to the rest of the gear and the staff monitoring the gear.

Unfortunately, no one method is guaranteed to be successful given the unpredictability and individualistic nature of sharks. However, together, all the methods provide the greatest chance of success. If we employ more than one method at a time, we still expect that the total number of removals will be low based on the low CPUE in the shallow lagoon. We will monitor the total number of baited hooks deployed across methods in order to remain within the catch quota of a combined total 20 sharks for 2010-2011, minimize bycatch and minimize accumulated bait. It is assumed that bycatch will be minimal and restricted to shark species, based on Meyer's crew's experience in 2009 with 6850 soak hours. Soak times will be limited to 1-3 hours (identical to Meyer's project). We will use the same bait type (large tuna heads and shark remains) and hook type (circle hook, size 18/0 to 20/0) as the Meyer's project, with the option of also using monk seal flesh from dead animals (after necropsy procedures and other sampling) as was done in 2005. Fish bait will be brought from outside the Monument. Remains of caught Galapagos shark may also be used as bait, as well as any dead bycatch. We will tend the gear to bycatch mortality (non-target species will be dehooked and released). Fishing staff will avoid culling non-target sharks through their proper identification. The only shark species that is likely to be confused with the Galapagos shark is the grey reef shark. The maximum size of 20 grey reef sharks caught across the NWHI was 159 cm (total length) in a 2003 study. Thus if a minimum size requirement for euthanizing is set above this figure, this confusion can be avoided (see Post-Catch Procedures below). The minimum total length permitted in 2010 was 160 cm, we suggest the same limit for 2011.

For handlines, a line will be baited (same bait as described above) from shore or from a small boat in the approximate area where a Galapagos shark has been observed. A hand-held harpoon will be used from shore or small boat when a shark is observed. A barbed shaft, on the end of the harpoon pole will be delivered by hand and the tip will be attached to wire cable and connecting line that will be used to retrieve the shark. For these methods, captured sharks will be hauled out on to the beach or to the side of the boat and tail-roped for euthanasia.

Bottomsets will be made to the specifications identical to those used in the Meyer's project permitted in the Monument to catch sharks in 2009, but may be adjusted to include 5-10 hooks. The gear is designed for clean bottoms only (i.e. sandy substrate with no potential for snagging). Approximately 200- 350m long ½ inch polypropylene mainline with overhand loops at regular

intervals (40-60m) for gangion (branch line with hook) attachment will be used. Each end of the mainline will have a buoy line consisting of 1/2-inch polypropylene with a cleat at the top and a Danforth anchor (9-12 lb) at the bottom. The buoy line length will be contingent on target set depth (45-75 feet depending on depth of deployment allowed). Gangions will consist of a stainless steel lobster trap clip (snaps onto mainline loops) with 2m of 1/2 inch polypropylene, a large swivel, 2m of 7/19 strand stainless steel aircraft cable (bite leader) to a 20/0 Mustad circle hook. Sets will be made from a small boat, and with short soak times of a maximum of 3 hours (in the daytime only).

The drumline will be of either of the following 2 designs. It may consist of a large buoy, with a chain trace attached to it and single baited hook, shackled to the other end of the chain trace. A baited hook will be suspended approximately 10 feet above the sea floor. A groundline will be shackled to the drum with a swivel, attached to a Danforth or CQR anchor and anchored to the bottom substrate. A scope of 3-4 times the water depth will be used. Alternatively, it may consist of 20ft of 1/2 in. polypropylene substituting for a chain trace, connected to the same branchline type used for the bottomsets described above. The opposite end of this mainline will be shackled to a float-line buoy that serves as the 'drum'. A chain will be run through this buoy with the other end shackled to an 8' yellow marker line. The other end of the yellow line will then be shackled to a large red buoy with the connected float line (same used for bottomsets). The drumline set-up is a modification of what was used in 2010 so that the single baited hook rests on the bottom and does not suspend in the water column. This is preferred because we are targeting a species that spends most of its time on the bottom feeding on demersal fishes. With this design, the drum-buoy functions as a 'bobber' that will sink or move when an animal is hooked.

The "Net Surprise" may be used to capture Galapagos sharks in nearshore, shallow areas. This apparatus is modeled on a design created by the Sea Mammal Research Unit, St. Andrews, UK, for catching seals in shallow nearshore areas. The "Net Surprise" consists of a central 350mm diameter deployment tube (similar to a fire hose) containing a tangle-net (nylon, large mesh, approximately 4 inches) inside of it and an underwater mounted diving cylinder (with a regulator and 10 bar pressure release valve) and airline at each terminal end. The diving cylinder and airline supply air to provide thrust and quick deployment of the tangle-net. Buoyed receivers with small antennae are connected to the diving cylinders via solenoid valves, and can be remotely triggered from the beach using standard radio equipment.

We intend to set the deployment tube in discrete areas of the nearshore habitat in islet sectors where sharks have been observed to patrol or pursue pups. The tube will be laid in a semi-circle configuration, arcing out approximately 5-10m from the shoreline. The tube will be weighted to the seafloor bottom by clipping it to a heavy anchor chain (8mm) of equal length to the tube; the terminal ends may also be attached to anchors on the beach to add stability. The net is only released upon trigger; it will not be released if large non-target animals (i.e. seals, turtles, birds, non-target shark species, large ulua) are in the water in the semi-circle area outlined by the tube or within 2m of the area outside of the tube or on the beachside opening. Multiple "Net Surprises" may be used to create a double-barrier design, creating two concentric arcs when deployed, in order to facilitate capturing a fast-moving shark. Multiple "Net Surprises" may be

set adjacent to each other in the nearshore areas in order to facilitate capturing a fast-moving shark. In this case, only one “Net Surprise” would be deployed per capture event (each “Net Surprise” has its own dedicated radio-trigger). For example, at the beginning of the day, two “Net Surprises” would be laid at sector 2E of Trig islet, each arcing out 10m. If Galapagos sharks are observed patrolling and pursuing a pup in the area outlined by the first “Net Surprise” but circling out into the area of the second net, only the second net would be deployed. Once the net is released and a shark is tangled, the net will be pulled onto the beach and the shark euthanized. The “Net Surprise” will be in 100% attendance once set. HMSRP will thoroughly test the “Net Surprise” in Oahu in 2011 before using it at FFS in 2011 to ensure that it deploys as intended and can be pulled in quickly. Such a test was done in 2010.

3. Post-catch procedures:

When a shark is hooked, harpooned, darted or netted it will be brought to shore or side of the small boat and tail-rope and euthanized with a .44 caliber bang stick. HMSRP has established bang stick safety protocols (used in 2010). Also, in 2010 shark fishers underwent firearms training through Koa Services Inc. This course or similar training could be repeated for any hire new to the project in 2011. HMSRP conducted an Operational Risk Management (ORM) on March 19, 2009 lead by Chad Yoshinga and Kathleen Gobush on the shark fishing operations. Operational Risk Management is a continual process which includes risk assessment, risk decision making, and implementation of risk controls, which results in acceptance, mitigation, or avoidance of risk. It is standard for HMSRP to conduct ORM and risk assessment for projects that may involve risks such as this shark predation mitigation work. The product was a Risk Assessment that will be updated to include the 2010 experience and provided to any staff hired for this project in 2011. Refresher training on use of the bang stick will occur boat side on inert material here in Oahu.

A minimum size requirement for euthanizing a Galapagos shark can be set to ensure that only large adults capable of feeding on monk seal pups are culled. We suggest 160cm forklength based observations in the field in 2010 and results of Meyer’s project in 2009 (made available to us in July 2010).

HMSRP will perform a necropsy on culled sharks on site (Tern island), including gut content inspection, morphometric measurements, and identification of sex and reproductive state. Procedures will mirror those done on monk seals, using the same kits, modified as necessary based on instructions in the Elasmobranch Husbandry Manual (editors M. Smith, D. Warmolts, D. Toney & R. Hueter). The main focus of shark necropsies will be to determine pregnancy and gut contents provide remains for Native Hawaiian cultural practices and take samples for scientific analysis.

Desired shark remains (i.e. teeth, belly skin) will be retained for Native Hawaiian cultural uses or practices as deemed desirable and appropriate by the State of Hawaii Office of Hawaiian Affairs. These desired remains will be removed from the carcass after the necropsy and stored as appropriate. Samples of muscle, liver, vertebrae for fatty acid and isotope/ diet analysis will be removed from the carcass after the necropsy and stored frozen. Vertebrae samples will likely be sent to Woods Hole Oceanographic Institute to be processed by Greg Skomal’s lab for isotope

analysis. Fatty acid profiles will likely be analyzed for data on prey recently consumed, likely Sara Iverson's laboratory at Dalhousie University. Stomach contents will be screened for monk seal DNA by geneticist Jennifer Schultz, PhD and provided to shark ecologists upon request.

Any remaining shark tissue will be disposed of at multiple deepwater locations outside of the atoll (latitude/longitude of the location will be recorded and avoided for additional disposals in the same year) or stored frozen and used for bait for future removal attempts that season. We suggest a distance of 0.5 mile from the FFS atoll's breaking reef. The 2010 permit required disposal at least 3 miles from the atoll. We request permission to dispose at 0.5 miles due to safety concerns of traveling 3 miles from the atoll in a small boat. Water depths and current 0.5 miles from the atoll are adequate.

4. Reporting:

A report that summarizes data concerning the removal of each shark will be submitted to the Monument one month after the expiration of this permit. This report will include environmental conditions at the time of removal, behavior or sightings of the individual prior to capture, identifying tags and physical features of the individual, location of the removal, method of removal, and method of euthanasia. Data about the carcass will also be included: morphometric measurements, gut contents, gender, reproductive status and the status of all remains (offered to the Native Hawaiian community, samples taken, use as bait or disposal and disposal location).

5. Evaluation:

The ultimate goal of the proposed conservation and management activity is to reduce the threat of shark predation to pre-weaned and newly weaned monk seal pups at FFS. The proximate goals are to monitor shark activity and remove up to 19 additional Galapagos sharks within 700m of shore of Trig, Round, Gin and Little Gin islets. We will consider the activity to have been successful if the proximate goals are achieved in 2011 and the achievement of the ultimate goal is apparent within 1-2 years. We expect a lag time in any measurable increase in pup survivorship from shark removal because it is likely to take an entire season to catch the number of sharks requested given the low CPUE in the shallow lagoon.

If the number of sharks removed in 2011 approximates 19 (which, in combination with the 2010 catch, approximates that recommended by Workshop participants), and no improvement in the proportion of pre-weaned and newly weaned pups lost to sharks (confirmed and inferred mortalities) is detectable within 1-2 years, then the idea of any additional shark removals will require careful consideration. If shark removal does not approximate these recommendations then such an improvement in survivorship from this source of mortality is not expected to be substantial.

Additional descriptions of:

Anchoring a vessel: small boats will be anchored at FFS according to standard practices included in the monk seal field camp permitted activities. This includes anchoring only in sandy

substrate and taking steps to avoid damaging of hard substrates (especially coral) with the anchor or chain.

Discharge: Any remaining shark tissue will be disposed of at multiple deepwater locations outside of the atoll (latitude/longitude of the location will be recorded and avoided for addition disposals in the same year) or stored frozen and used for bait for future removal attempts that season. We suggest a distance of 0.5 mile from the FFS atoll's breaking reef. The 2010 permit required disposal at least 3 miles from the atoll. We request permission to dispose at 0.5 miles due to safety concerns of traveling 3 miles from the atoll in a small boat. Water depths and current 0.5 miles from the atoll are adequate.

NOTE: If land or marine archeological activities are involved, contact the Monument Permit Coordinator at the address on the general application form before proceeding, as a customized application will be needed. For more information, contact the Monument office on the first page of this application.

9a. Collection of specimens - collecting activities (would apply to any activity): organisms or objects (List of species, if applicable, attach additional sheets if necessary):

Common name:

Galapagos shark

Scientific name:

Carcharhinus galapagensis

& size of specimens:

19/adult

Collection location:

French Frigate Shoals, inside the atoll, near pupping sites

☒ Whole Organism ☐ Partial Organism

9b. What will be done with the specimens after the project has ended?

Necropsy conducted, samples retained, tissues/teeth provided to Native Hawaiian cultural practioners as desired by OHA.

Samples will be sent to :

Woods Hole Oceanographic Institute/ diet analysis through isotope screening (vertebrae) (Greg Skomal)

Dalhousie University/ diet analysis through fatty acid profiles (liver) (Sarah Iverson)

NOAA toxicologist (Marie Yasmine Bottein)/ Ciguatera and mercury level testing (muscle and liver)

NMFS geneticist/ genotyping (DNA from fin clip) (Jenny Schultz)

NMFS geneticist/ prey identification (DNA from stomach contents, if available) (Jenny Schultz).

With regard to the distribution of tissues/teeth, we will coordinate with Kehau Watson, the contract liason with PIRO for Native Hawaiian community collaboration, as was done in 2010.

9c. Will the organisms be kept alive after collection? ☐ Yes ☒ No

• General site/location for collections:
inside the FFS atoll near pupping sites

• Is it an open or closed system? ☐ Open ☐ Closed
n/a

• Is there an outfall? ☐ Yes ☐ No
n/a

• Will these organisms be housed with other organisms? If so, what are the other organisms?
no

• Will organisms be released?
no

10. If applicable, how will the collected samples or specimens be transported out of the Monument?

Biological samples collected from Galapagos sharks will be stored as appropriate (i.e. in vials with dmso, in liquid nitrogen, dry etc.). All samples will be transported out of the

Monument aboard the R/V Oscar Elton Sette, M/V Kahana, M/V Searcher or aboard aircraft.

11. Describe collaborative activities to share samples, reduce duplicative sampling, or duplicative research:

Shark necropsy and tissue samples will be offered to HIMB and other shark ecologists.

12. List all specialized gear and materials to be used in this activity:

Polypropylene mainline, buoy lines, gangions, bite leaders, lobstertrap clips, swivels, gaffs, meter caliper, leads, gloves, crimpers, cutters, hooks, knives, bolt cutter, buoys with anchor rode and anchor, chain traces, danforth anchors, SS wire, 3/0 interlock snap swivel, mustad circle hooks (18/0 - 20/0), bangstick, ammunition (44 magnum catridges Remington), hand-held harpoon, nylon material netting with low stretch and good rot resistance (4 inch), Velcro, nylon cord, stainless steel clips, 20 bar working pressure fire hose, pvc, pressure relief valve, Stainless steel elbow, T-piece and hose fittings, airline, solenoid valves, regulators and 10bar pressure relief valve, diving cylinders, waterproof housing buoys with waterproof connector and multicore cable, receivers and programmable trigger, bait cooler, bait (large tuna heads), camping gear, night-vision scope. Bottomsets will be made by Pacific Ocean Producers to be identical to that used in the Meyer's project only adjusted for minimum of 5 hooks and up to 10 hooks (Meyer used ten hooks), and the possibility of an increased interval of 60m between branchlines, which would result in an increased groundline length of approximately 350m. A bottomset with a wider reach may prove beneficial in catching Galapagos sharks.

13. List all Hazardous Materials you propose to take to and use within the Monument:

As listed on the Manager's permit: chemicals related to necropsy and tissue preservation (formalin, DMSO and/or ethyl alcohol for genetics and fatty acid analysis), also bangstick ammunition (.44 caliber magnum cartridges).

15 ml vials with 20% DMSO, count 20

10% buffered formalin, 500ml

ethanol, 0.5 gallons

bangstick ammunition (.44 caliber magnum cartridges), 2 boxes of 20 cartridges

Propane for freezers (tanks 60#), 28

Propane for camp stove (canisters 2#), 10

Non-ethanol gasoline (drums, 55 gallon), 6

14. Describe any fixed installations and instrumentation proposed to be set in the Monument:

none

15. Provide a time line for sample analysis, data analysis, write-up and publication of information:

Report to the Monument: October 30, 2011

Necropsies focused on the gross anatomy immediately upon death

Preliminary gut content analysis- immediately upon death

Fatty acid, genetic (including genetic analysis of gut contents) and vertebrae analysis:

TBD- will be sent out for analysis

16. List all Applicant's publications directly related to the proposed project:

Gobush, K.S. 2010. Shark predation on Hawaiian monk seals: Workshop II & post-workshop developments, November 5-6, 2008. U.S. Dep. Commer., NOAA Tech. Memo., NOAA-TM-NMFS-PIFSC-21, 43 p. + Appendices.

Harting, A., G. Antonelis, B. Becker, S.M. Canja, D. Luers, and A. Dietrich. In Prep. Galapagos Sharks and Hawaiian Monk Seals: A Conservation Conundrum. Marine Mammal Science.

Hawn, D. 2000. Galapagos shark (*Carcharhinus galapagensis*) removal and shark sighting observations at Trig Island, French Frigate Shoals during the 2000 Hawaiian monk seal field season. Prepared for National Marine Fisheries Service, Southwest Fisheries Science Center, Honolulu Laboratory. Contract Order 40JJNF000208. 25 pp.

Hayes, S. 2002. Galapagos shark predation of monk seal pups at Trig Island, FFS 2001. Unpublished report. Prepared under contract for U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Honolulu, HI. 22 pp.

NMFS, 2002. Environmental assessment for the proposed experimental shark removal to enhance preweaned monk seal pup survival at Trig Island, French Frigate Shoals, Hawaiian Islands National Wildlife Refuge. Prepared under contract for U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Honolulu, HI. 46 pp.

NMFS. 2003. Shark predation at Trig Island, 2002. Prepared under contract for U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Honolulu, HI. 38 pp.

NMFS 2004. Shark predation at French Frigate Shoals, 2003. Prepared under contract for U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Honolulu, HI. 56 pp.

NMFS 2005. Shark Predation at French Frigate Shoals, 2004. Prepared under contract for U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Honolulu, HI. 36 pp.

NMFS. 2007. Recovery plan for the Hawaiian monk seal (*Monachus schauinslandi*) 165 p. U.S. Department of Commerce, National Oceanic and Atmospheric Agency, Silver Spring, Maryland.
NMFS. 2009. Programmatic environmental assessment of the program for decreasing or eliminating predation of pre-weaned Hawaiian monk seal pups by Galapagos sharks in the Northwestern Hawaiian Islands. 76 p. U.S. Department of Commerce, National Oceanic and Atmospheric Agency, Honolulu, Hawaii.

NMFS. In Prep. Shark Predation on Hawaiian Monk Seals: Minutes of the Workshop Sponsored by the Pacific Island Fisheries Science Center and the Pacific Islands Regional Office. Prep. By Harting Biological Consulting, Bozeman, Montana for U.S. Department of Commerce, Pacific Islands Fisheries Science Center, Honolulu, HI. 66 pp.

Peschon, J.D. 2002. 2002 Trig Island shark project report. Prepared under contract for U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Honolulu, HI.

Peschon, J., D. Luers, B. Becker, and M. Niemeyer. 2003. 2003 French Frigate Shoals shark predation project report. Prepared under contract for U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Honolulu, HI.

With knowledge of the penalties for false or incomplete statements, as provided by 18 U.S.C. 1001, and for perjury, as provided by 18 U.S.C. 1621, I hereby certify to the best of my abilities under penalty of perjury of that the information I have provided on this application form is true and correct. I agree that the Co-Trustees may post this application in its entirety on the Internet. I understand that the Co-Trustees will consider deleting all information that I have identified as “confidential” prior to posting the application.

Signature

Date

**SEND ONE SIGNED APPLICATION VIA MAIL TO THE MONUMENT OFFICE
BELOW:**

Papahānaumokuākea Marine National Monument Permit Coordinator
6600 Kalaniana'ole Hwy. # 300
Honolulu, HI 96825
FAX: (808) 397-2662

DID YOU INCLUDE THESE?

- ☐ Applicant CV/Resume/Biography
- ☐ Intended field Principal Investigator CV/Resume/Biography
- ☐ Electronic and Hard Copy of Application with Signature
- ☐ Statement of information you wish to be kept confidential
- ☒ Material Safety Data Sheets for Hazardous Materials

Papahānaumokuākea Marine National Monument Compliance Information Sheet

1. Updated list of personnel to be covered by permit. List all personnel names and their roles here (e.g. John Doe, Diver; Jane Doe, Field Technician, Jerry Doe, Medical Assistant): Shawn Farry, lead field staff, Mark Sullivan, co-leader, Ben Book, assistant, Brendan Hurley, assistant

2. Specific Site Location(s): (Attach copies of specific collection locations): French Frigate Shoals (Tern, Trig and Gins islets)

3. Other permits (list and attach documentation of all other related Federal or State permits): ESA 10137 and IACUC in review

3a. For each of the permits listed, identify any permit violations or any permit that was suspended, amended, modified or revoked for cause. Explain the circumstances surrounding the violation or permit suspension, amendment, modification or revocation. none

4. Funding sources (Attach copies of your budget, specific to proposed activities under this permit and include funding sources. See instructions for more information): NOAA-NMFS-PIFSC-PSD-HMSRP programmatic funds

5. Time frame:

Activity start: April 10, 2011

Activity completion: latest possible date is September 1, 2011, however see response below.

Staff is likely to return on the OES in August 2011.

Dates actively inside the Monument:

All staff will enter the Monument via the HMSRP seal recovery work via the Manager's permit

From: April 5, 2011

To: August 2011, exact date to be determined upon NOAA vessel OES schedule

Describe any limiting factors in declaring specific dates of the proposed activity at the time of application: OES vessel schedule has not been cemented yet.

Personnel schedule in the Monument: Dropped of at Tern on April 6, remain at FFS until August 2011 pickup and return to Honolulu.

See Manager's permit compliance form please for answers to questions 6-10.

6. Indicate (with attached documentation) what insurance policies, bonding coverage, and/or financial resources are in place to pay for or reimburse the Monument trustees for the necessary search and rescue, evacuation, and/or removal of any or all persons covered by the permit from the Monument:
All four staff are RCUH JIMAR staff.

7. Check the appropriate box to indicate how personnel will enter the Monument:

x ☐ Vessel
☐ Aircraft

Provide Vessel and Aircraft information: OES NOAA vessel Oscar Elton Sette

8. The certifications/inspections (below) must be completed prior to departure for vessels (and associated tenders) entering the Monument. Fill in scheduled date (attach documentation):

☐ Rodent free, Date:
☐ Tender vessel, Date:
☐ Ballast water, Date:
☐ Gear/equipment, Date:
☐ Hull inspection, Date:

9. Vessel information (NOTE: if you are traveling aboard a National Oceanic and Atmospheric Administration vessel, skip this question):

Vessel name: OES Oscar Elton Sette

10. Tender information:

On what workboats (tenders) will personnel, gear and materials be transported within the Monument? List the number of tenders/skiffs aboard and specific types of motors:
Staff will use two 17 foot skiffs while at FFS (Boston whalers, 4-stroke outboard engines Honda 70 and Yamaha 50)

Additional Information for Land Based Operations

All staff for this permit will be also on the Manager's permit for regular seal recovery work duties, thus their transport, gear, housing etc. are all covered within that permit as well. Nothing new is needed under this permit (i.e. there is no additional staff or staff needs beyond the other permit); however, shark samples would be additional.

11. Proposed movement of personnel, gear, materials, and, if applicable, samples: Personnel will be transported via the OES. Gear is already housed at Tern island, FFS. Samples will return via the OES to Honolulu to be stored at Kewalo Research Facility

12. Room and board requirements on island: housing at Tern via the seal recovery work via the Manager's permit

13. Work space needs: computer use, space for 3 propane freezers at Tern via the seal recovery work via the Manager's permit

DID YOU INCLUDE THESE?

- ☐ Map(s) or GPS point(s) of Project Location(s), if applicable
- ☐ Funding Proposal(s)
- ☐ Funding and Award Documentation, if already received
- ☐ Documentation of Insurance, if already received
- ☐ Documentation of Inspections
- ☐ Documentation of all required Federal and State Permits or applications for permits